Geo-Note 2005-03

Preliminary Release of Selected Stream Sediment and Water Geochemical Results from the 2004 National Geochemical Reconnaissance Survey in the Buffalo Head Hills, Northern Alberta (Parts of NTS 84B, 84C, 84F and 84G)

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Abstract

In 2004, a National Geochemical Reconnaissance Survey (NGR) stream sediment and stream water geochemical survey was undertaken by the Geological Survey of Canada (GSC) and Alberta Geological Survey (AGS) in the northern and southern parts of the Buffalo Head Hills of north-central Alberta. Results from the 2004 survey augment NGR data obtained in the Buffalo Head Hills area during 2001, 2002 and 2003.

Preliminary analytical data, obtained from samples collected at 122 field sites in 2004, are released in this report for

(a) stream sediment nickel, copper, zinc, arsenic, molybdenum, silver, barium, mercury and lead, and
(b) stream water pH and conductivity.

The reader is cautioned that not all of the usual NGR quality control checks have been performed on the analytical data contained in this report. However, the results of the 2004 survey are believed to have mineral exploration and environmental significance, and an early release of information was deemed appropriate.

Markedly acidic waters occur in some streams draining the northern Buffalo Head Hills (pH values as low as 3.3). In addition, streams draining the northern and northeastern flanks of the Buffalo Head Hills are commonly characterized by relatively elevated conductivity values. In comparison to stream sediments from other parts of the Buffalo Head Hills area, the stream sediments (silts) collected from streams flanking the northern Buffalo Head Hills tend to contain elevated amounts of nickel, copper, zinc, molybdenum, silver, mercury, lead and, to a lesser extent, barium.

1 Introduction

In 2004, a National Geochemical Reconnaissance Survey (NGR) stream sediment and stream water geochemical survey was undertaken by the Geological Survey of Canada (GSC) and Alberta Geological Survey (AGS) in the northern and southern parts of the Buffalo Head Hills of north-central Alberta (Figure 1). Results from the 2004 survey augment NGR data obtained in the Buffalo Head Hills area during 2001, 2002 and 2003 (Friske et al., 2003; McCurdy et al., 2004). The Buffalo Head Hills form a northerly trending upland region lying between the Peace River Lowland (Cadotte Plain) to the west and the Wabasca Lowland (Loon Lake Plain) to the east (Pettapiece, 1986). Access to sample sites was mainly by helicopter from La Crete for the northern survey area, and Red Earth Creek for the southern survey area.

Preliminary analytical data are released in this report for nickel, copper, zinc, arsenic, molybdenum, silver, barium, mercury and lead contents of stream sediment samples collected from 122 field sites in 2004 (Figure 2; Appendix 1; Appendix 2). Also released are stream water pH and conductivity measurements collected by field personnel. A considerable amount of additional analytical data obtained from the 2004 survey will be released later. The reader is cautioned that not all of the usual NGR quality control checks have been performed on the analytical data contained in this report. However, the results of the 2004 survey are believed to have mineral exploration and environmental significance, and an early release of some information was deemed appropriate.

This NGR project is aligned with Alberta's plan for a multi-year, multi-disciplinary geochemical and indicator mineral study in the northern part of the province. The Geological Survey of Canada, under the Targeted Geoscience Initiative II (TGI II) and Northern Resources Development Program, and the Alberta Energy and Utilities Board/Alberta Geological Survey (EUB/AGS) funded the 2004 survey. Analytical results and field observations contribute to building a national geochemical database for resource assessment, mineral exploration, geological mapping and environmental studies. Sample collection, preparation procedures and analytical methods are strictly specified and carefully monitored to ensure consistent and reliable results regardless of the area, the collection year or the analytical laboratory undertaking the analyses (Friske and Hornbrook, 1991).

2 Sample Collection

2.1 Stream Sediment (Silt) Samples

At each site, a pre-labelled Kraft paper bag (12.5 cm x 28 cm with side gussets) was two-thirds filled with silt and/or very fine-grained to fine-grained sand collected from the active stream channel. Although the samples commonly contain sand and may contain clay in addition to silt, these samples are traditionally referred to as silt samples. In practice, the stream silt sample was collected after water samples were collected, but before collection of a bulk sediment sample. Commonly, the sampler collected handfuls of fine-grained sediment from various points in the active stream channel while moving gradually upstream. If the stream channel consisted mainly of clay, coarse material or organic sediment from which suitable sample material is scarce or absent, moss mat from the stream channel, which commonly contains trapped silt, may have been added to the sample. Sample descriptions are provided in Appendix 3. Flagging tape with a sample site number was used to mark sample sites.

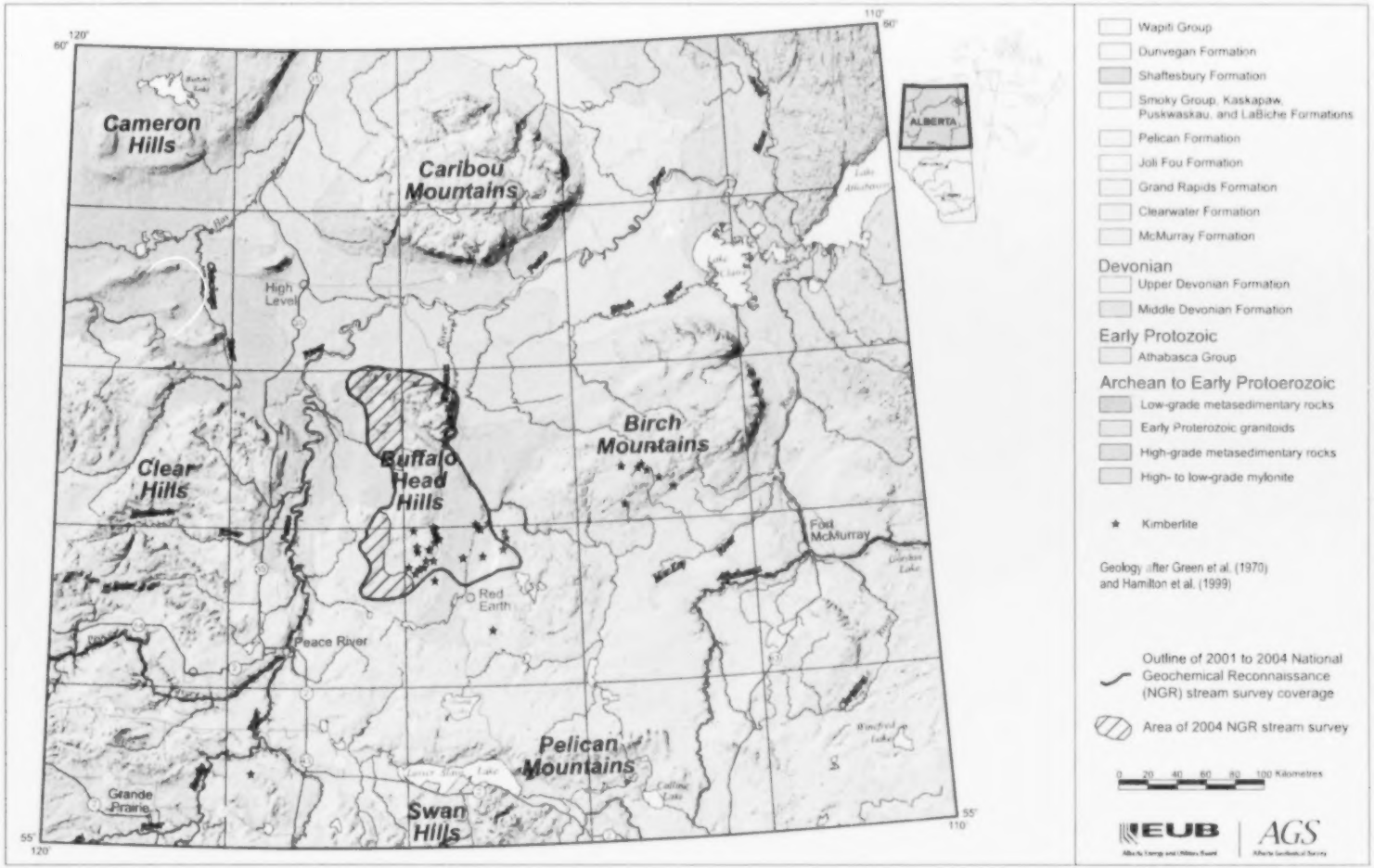


Figure 1. Location of 2004 stream survey.

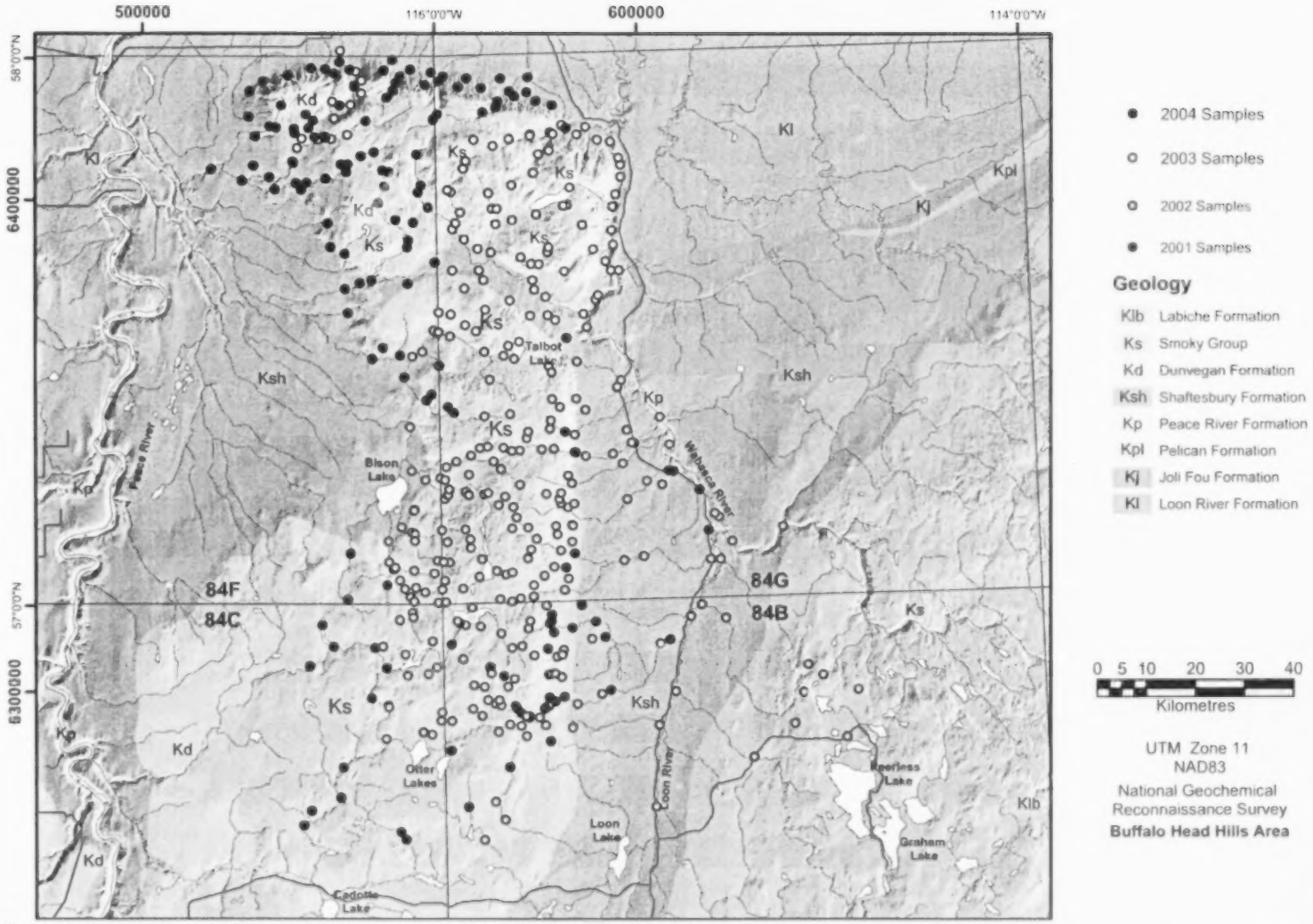
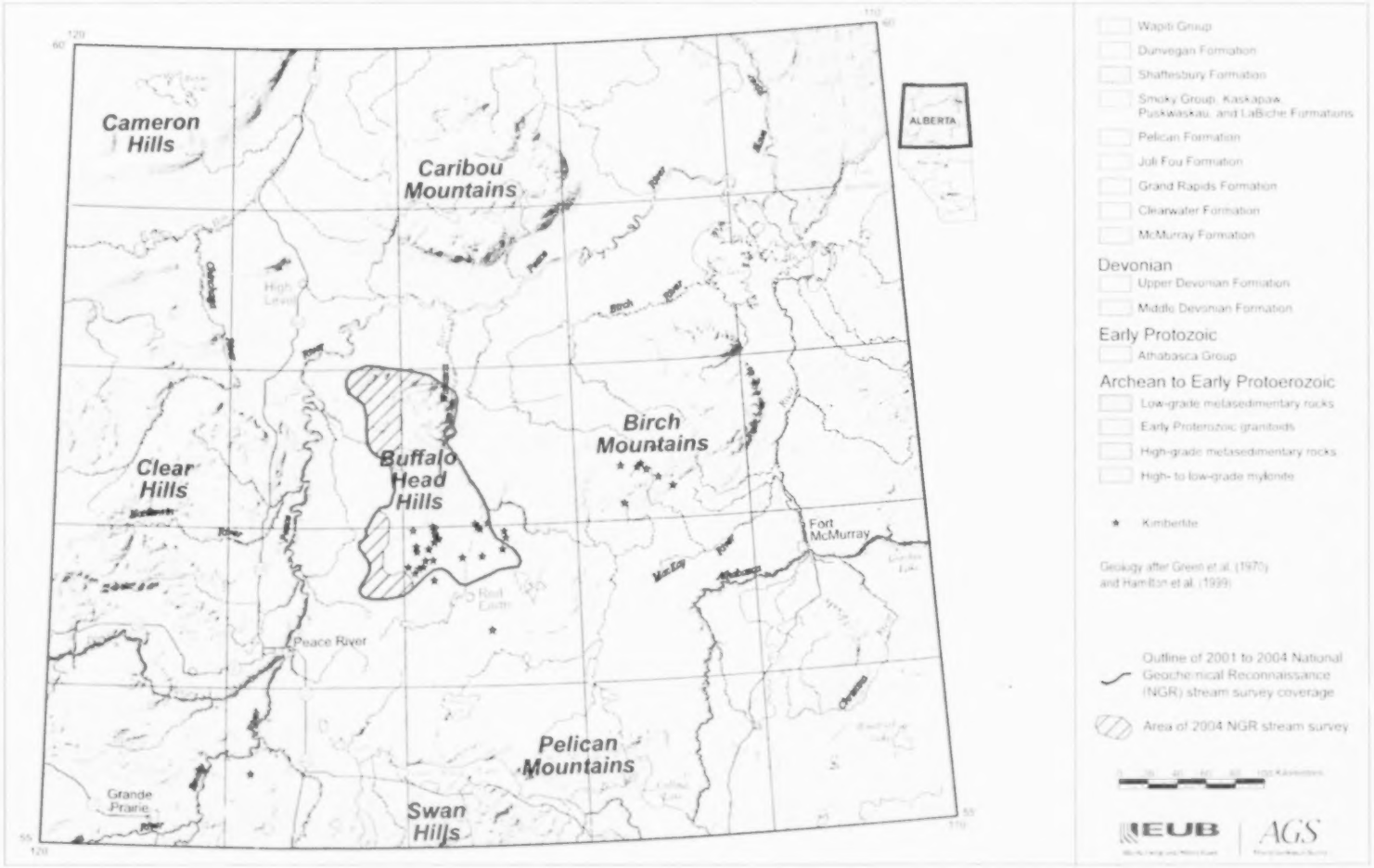


Figure 2. Distribution of 2001 to 2004 sample sites in the Buffalo Head Hills area.



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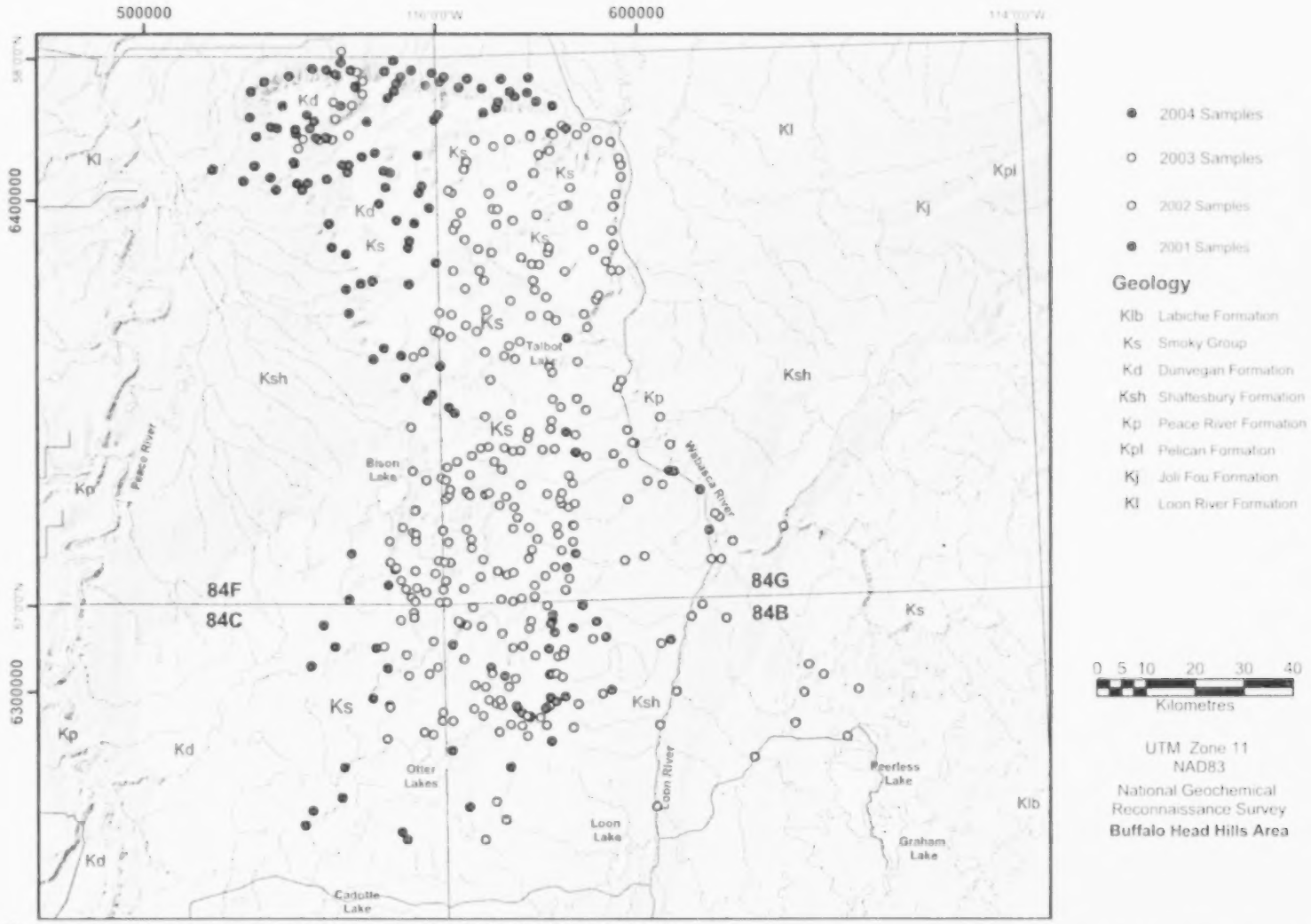

Figure 2. Distribution of 2001 to 2004 sample sites in the Buffalo Head Hills area.

2.2 Stream Waters

Water samples were sampled in mid-channel, from flowing water where possible, at every site. Samples were collected in two 125-ml Nalgene high-density polyethylene (HDPE) bottles. Samples were collected after first rinsing each bottle three times in flowing water before a final fill. Sample descriptions are provided in Appendix 3.

3 Sample Preparation

3.1 Stream Sediment (Silt) Samples

The Kraft paper bags containing the stream silt samples were placed into plastic bags, taped with electrical tape and shipped directly to Acme Analytical Laboratories of Vancouver, British Columbia, where they were air-dried at temperatures below 40°C and sieved through a minus 80-mesh (177 µm) screen. Control reference and blind duplicate samples were inserted into each block of 20 stream sediment (silt) samples.

3.2 Stream Water Samples

One set of water samples was filtered within 24 hours of collection through single-use Millipore Sterivex-HV 0.45-µm filter units attached to 50-ml or 60-ml sterile plastic syringes (syringes were re-used after rinsing with distilled, deionized water, but replaced daily). After 50 ml of water was filtered into new 60-ml bottles, the remainder was used for the determination of pH and conductivity before being discarded. Using an Eppendorf pipettor with disposable plastic tips, 0.5 ml of 16M nitric acid (HNO_3)was added to filtered water samples. At this point, control reference samples (filter, acid and travel blanks) were inserted. Filtered and acidified waters were kept in a cool, dark place until shipment to the lab. Control reference samples were inserted into each block of 20 water samples. No duplicate water samples were collected.

The second set of water samples was shipped to the laboratory for analysis without modification (analytical results from these unmodified samples are not included in this report).

4 Analytical Procedures

4.1 Stream Sediment Determinations by Inductively Coupled Plasma Mass Spectrometry

Determinations of nickel, copper, zinc, arsenic, molybdenum, silver, barium, mercury and lead (and additional elements not released in this report) in the <80 mesh fraction of the stream silt samples by inductively coupled plasma mass spectrometry (ICP-MS) was completed by Acme Analytical Laboratories of Vancouver, British Columbia. For each sample, one gram of <80 mesh material was leached with 6 ml of HCl, HNO_3, and distilled, deionized water, in equal volume proportions, at 95° C for one hour. The sample solution was diluted with deionized water to 20 ml and analysed by inductively coupled plasma emission spectroscopy on a Jarell-Ash instrument and inductively coupled plasma mass spectroscopy on a Perkin-Elmer Elan instrument. Lower detection limits by ICP-MS are listed in Table 1.

Table 1. ICP-MS lower detection limits (stream sediment samples).

Element	Lower Detection Limit
Nickel (Ni)	0.1 ppm
Copper (Cu)	0.01 ppm
Zinc (Zn)	0.1 ppm
Arsenic (As)	0.1 ppm
Molybdenum (Mo)	0.01 ppm
Silver (Ag)	2 ppb
Barium (Ba)	0.5 ppm
Mercury (Hg)	5 ppb
Lead (Pb)	0.01 ppm

4.2 Water pH and Conductivity

The pH of stream waters was determined using a Hanna Instruments HI 98129 pH and EC meter with automatic temperature compensation, a pH range of 0.00 to 16.0, resolution of 0.01 pH and a stated accuracy of ±0.01 pH at 20° C. The meter was calibrated during the survey using commercial buffer solutions.

The conductivity of stream waters was determined using a Hanna Instruments HI 98129 pH and EC meter with automatic temperature compensation, a conductivity range of 0 to 3999 µS/cm, a resolution of 1 microsiemen (µS)/cm and a stated full-scale accuracy of ±2%, and a temperature compensation coefficient (β) of 1.9 (factory setting). The meter was calibrated during the survey using commercial conductivity standards.

5 Results

Maps showing selected geochemical results from the 2001 to 2004 NGR stream water and stream sediment (<80 mesh) surveys in the Buffalo Head Hills area are presented in Appendix 2. Stream water pH and conductivity measurements from the 2004 water samples are listed in Appendix 3and ICP-MS values from the 2004 stream sediment (<80 mesh) samples are listed in Appendix 4.

6 Discussion

Markedly acidic waters occur in some streams draining the northern Buffalo Head Hills (pH values as low as 3.3). In addition, streams draining the northern and northeastern flanks of the Buffalo Head Hills are commonly characterized by relatively elevated conductivity values. In comparison to stream sediments from other parts of the Buffalo Head Hills area, the stream sediments (silts) collected from streams flanking the northern Buffalo Head Hills tend to contain elevated amounts of nickel, copper, zinc, molybdenum, silver, mercury, lead and, to a lesser extent, barium.

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Appendix 1 – Figures Showing Sample Site Locations

Figures:

Figure 3. Sample sites in the Steephill Creek-Donaldson Lake area (NE part of NTS 84F).

Figure 4. Sample sites in the Rat Creek-Wadlin Lake area (NW part of NTS 84G).

Figure 5. Sample sites in the Buffalo River-Talbot Lake area (parts of NTS 84F and 84G).

Figure 6. Sample sites in the Haig Lake-Otter Lakes area (parts of NTS 84B, 84C, 84F and 84G).

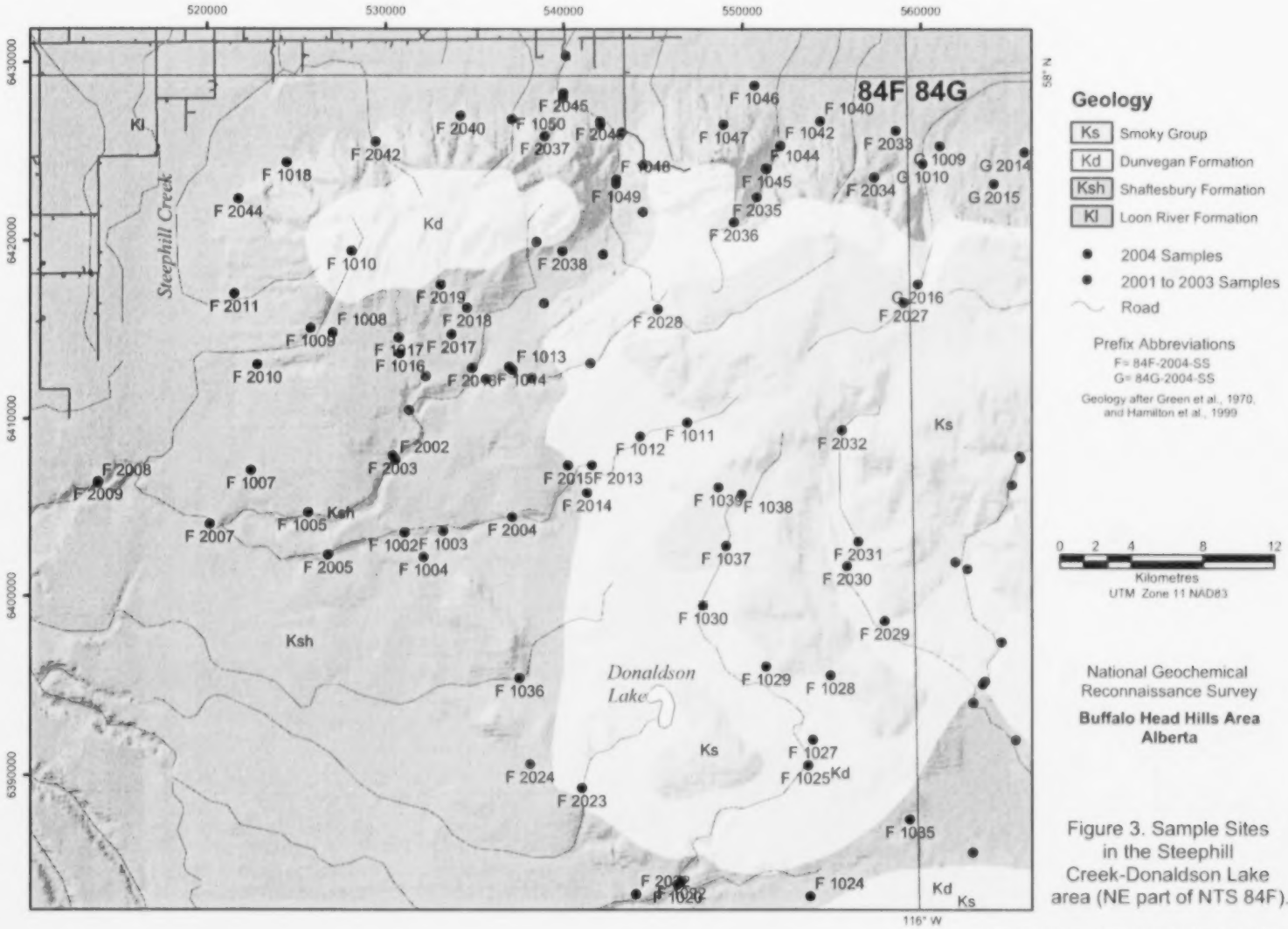
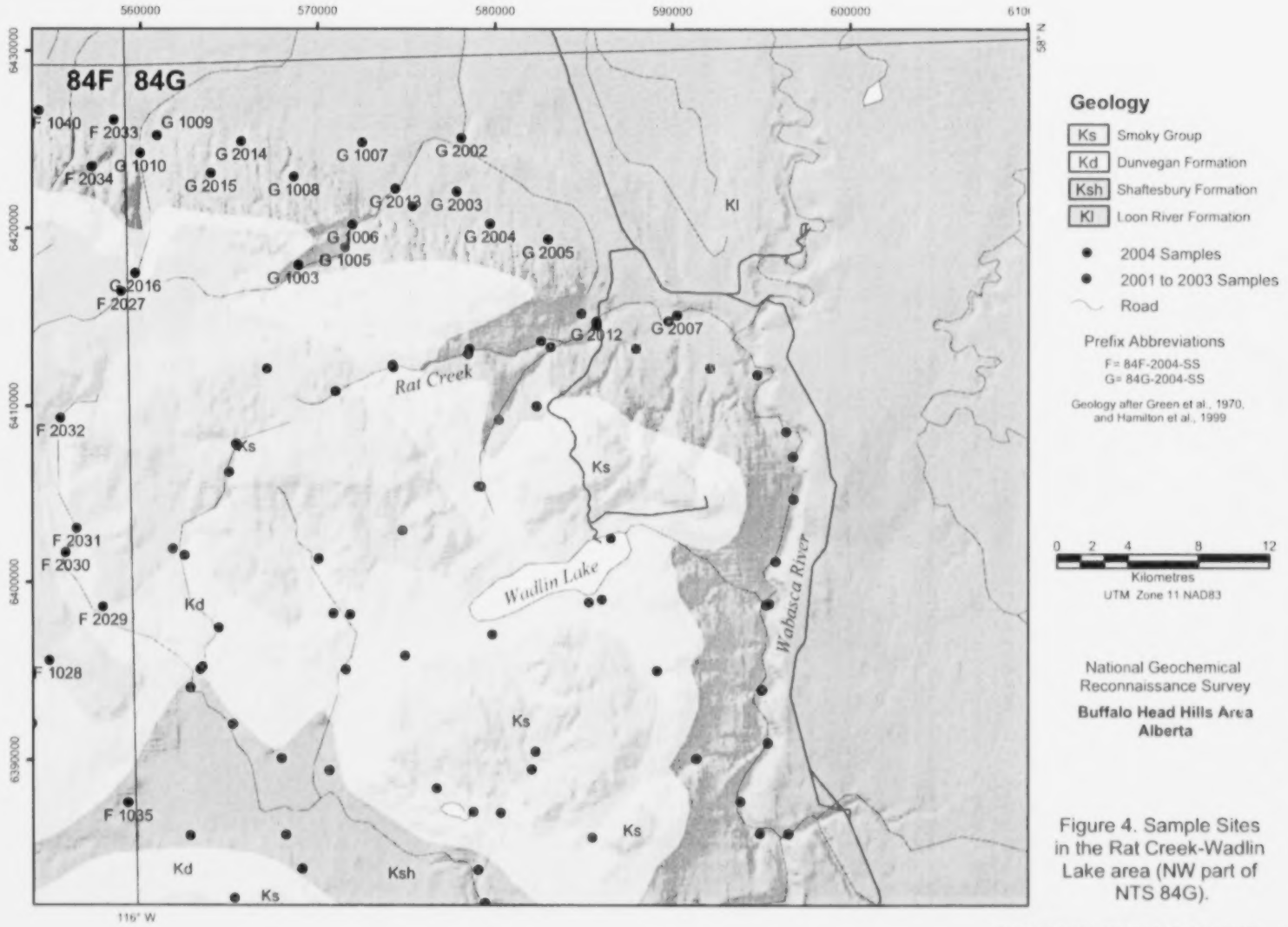


Figure 3. Sample Sites in the Steephill Creek-Donaldson Lake area (NE part of NTS 84F).



Geology

- Ks — Smoky Group
- Kd — Dunvegan Formation
- Ksh — Shaftesbury Formation
- Kl — Loon River Formation

- 2004 Samples
- 2001 to 2003 Samples
- Road

Prefix Abbreviations

F= 84F-2004-SS
G= 84G-2004-SS

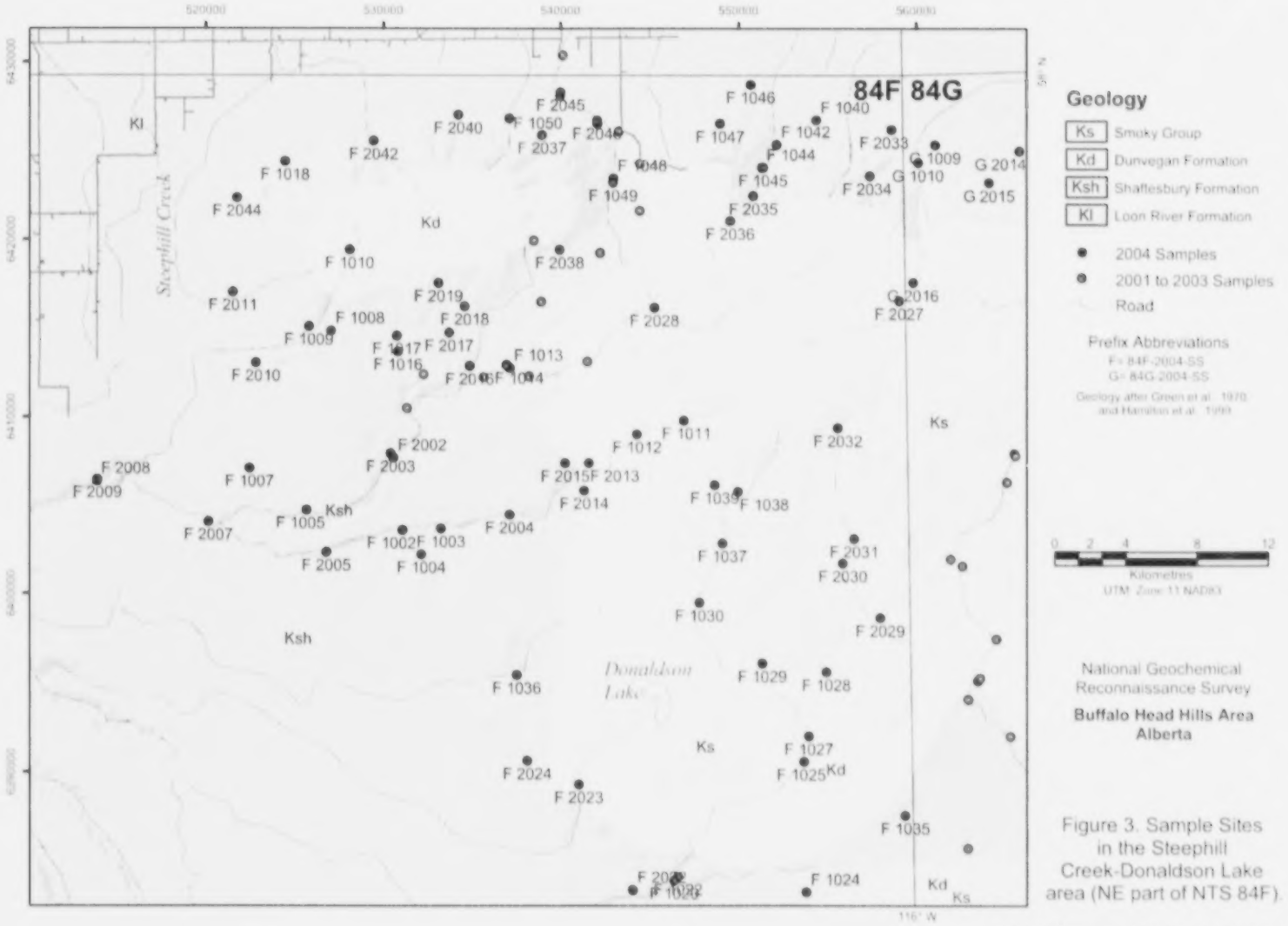
Geology after Green et al., 1970, and Hamilton et al., 1999

0 2 4 8 12
Kilometres
UTM Zone 11 NAD83

National Geochemical Reconnaissance Survey

Buffalo Head Hills Area Alberta

Figure 4. Sample Sites in the Rat Creek-Wadlin Lake area (NW part of NTS 84G).



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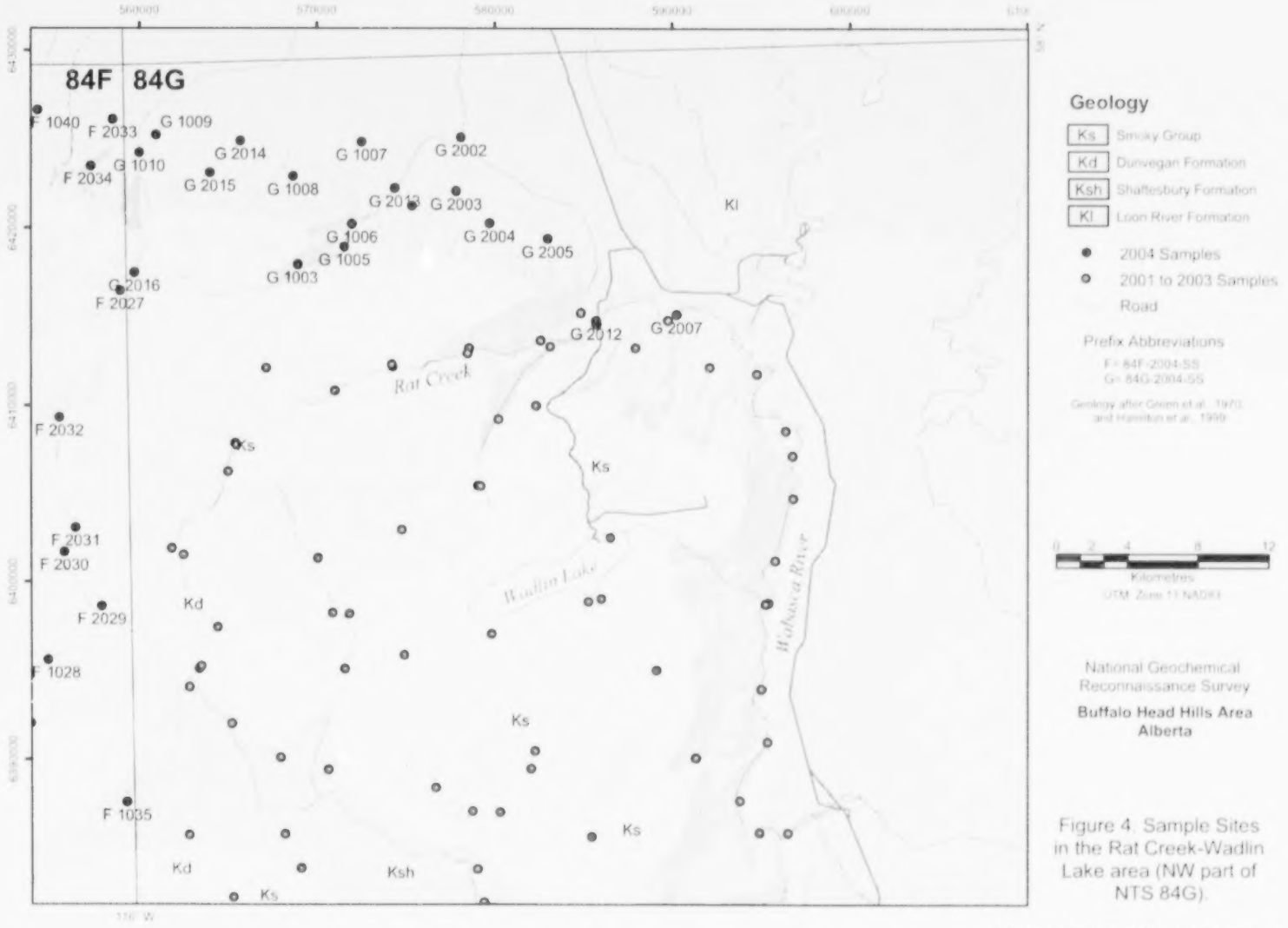


Figure 4. Sample Sites in the Rat Creek-Wadlin Lake area (NW part of NTS 84G).

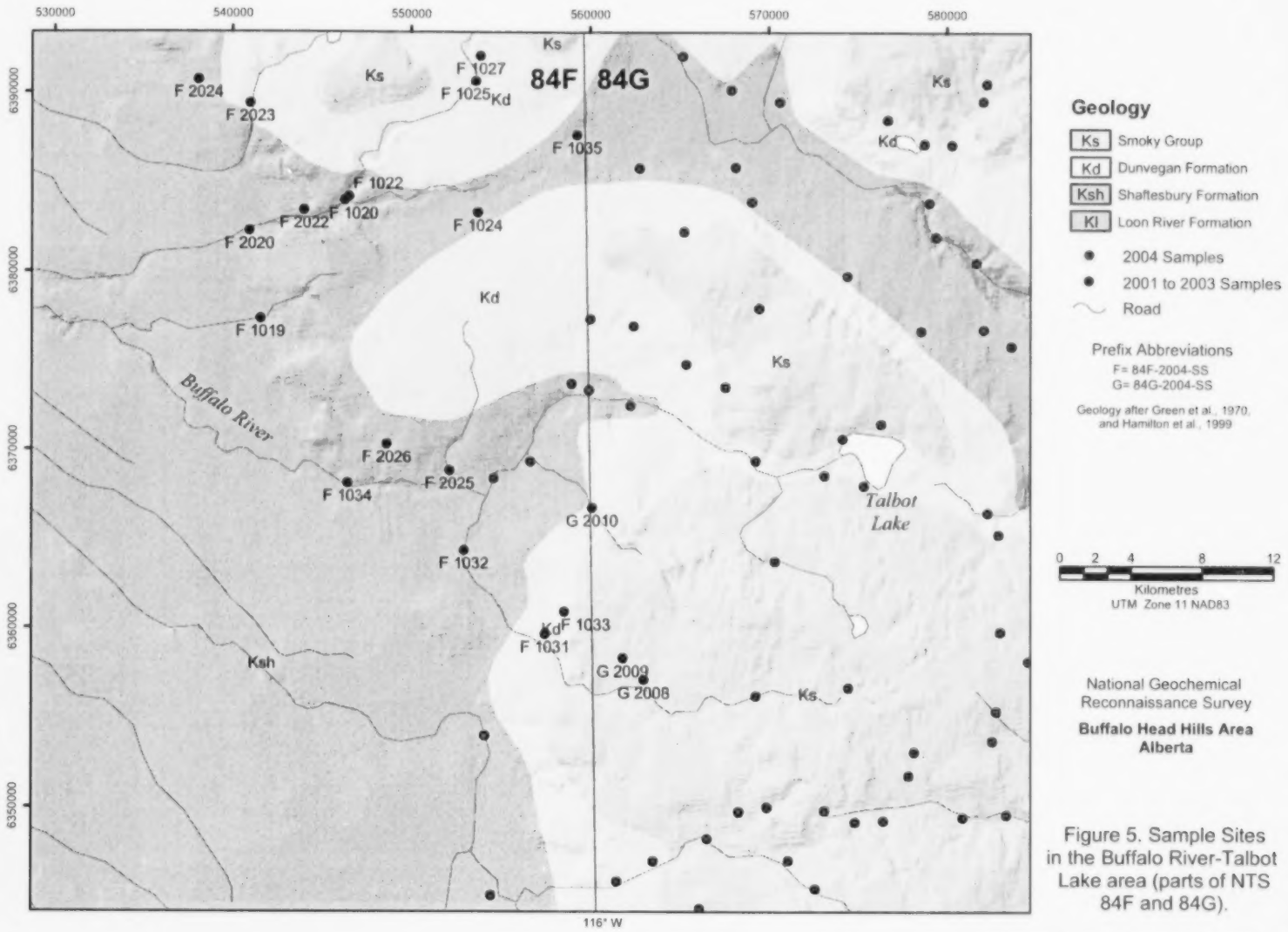


Figure 5. Sample Sites in the Buffalo River-Talbot Lake area (parts of NTS 84F and 84G).

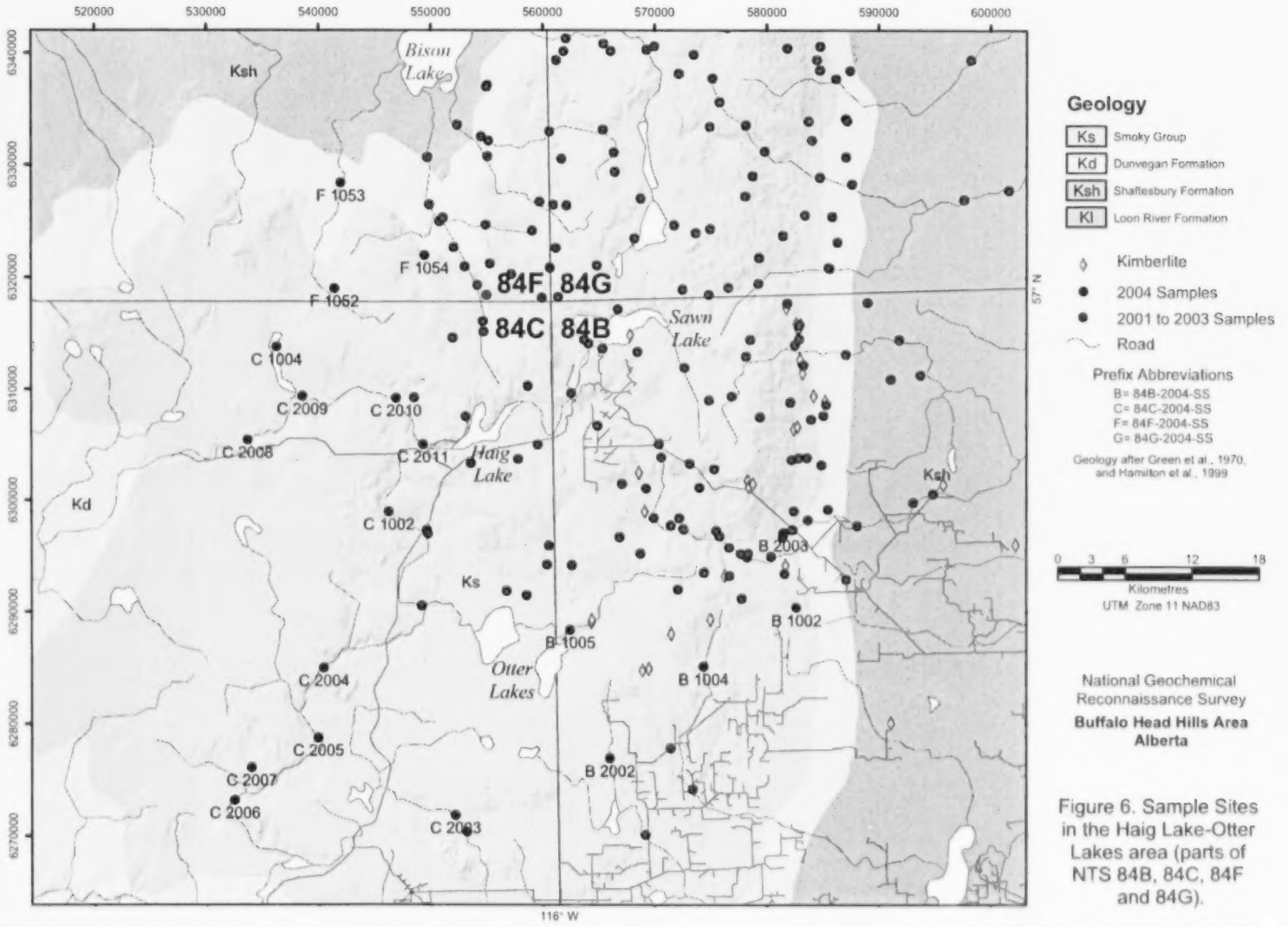
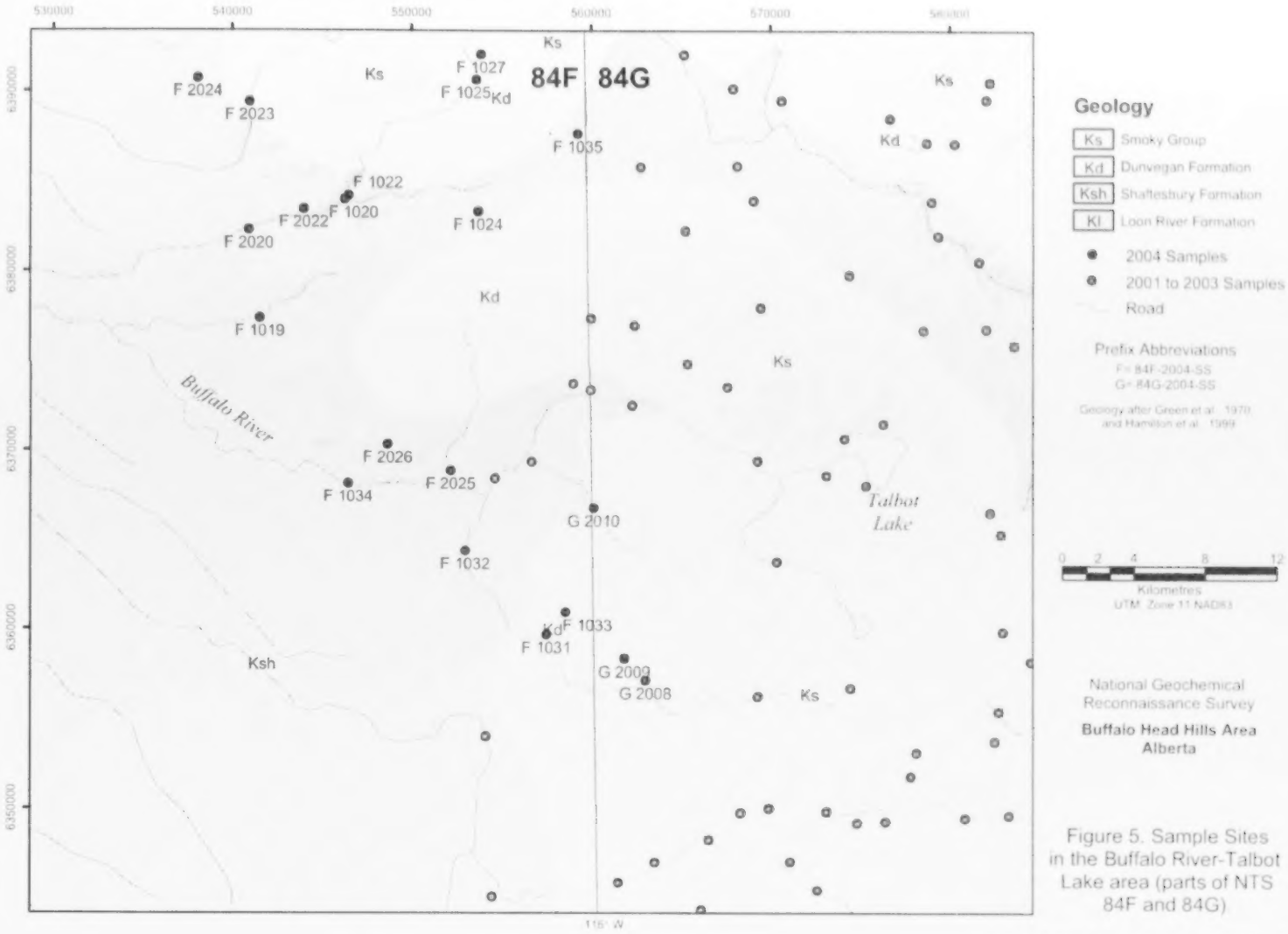


Figure 6. Sample Sites in the Haig Lake-Otter Lakes area (parts of NTS 84B, 84C, 84F and 84G).



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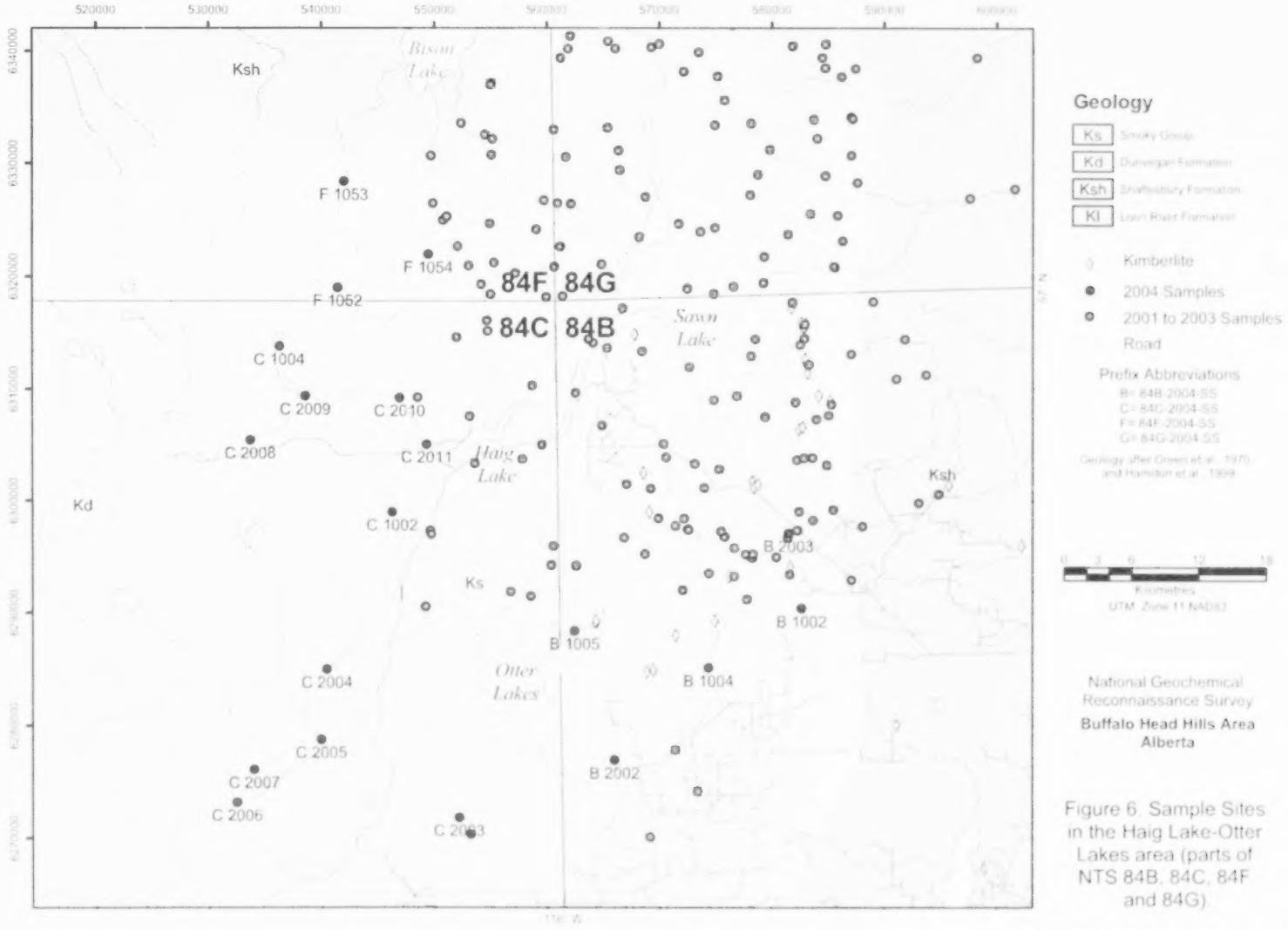

Figure 6. Sample Sites in the Haig Lake-Otter Lakes area (parts of NTS 84B, 84C, 84F and 84G).

Appendix 2 – Figures Showing Selected Geochemical Results from the 2001 to 2004 NGR Stream Water and Stream Sediment (<80 Mesh) Surveys in the Buffalo Head Hills Area

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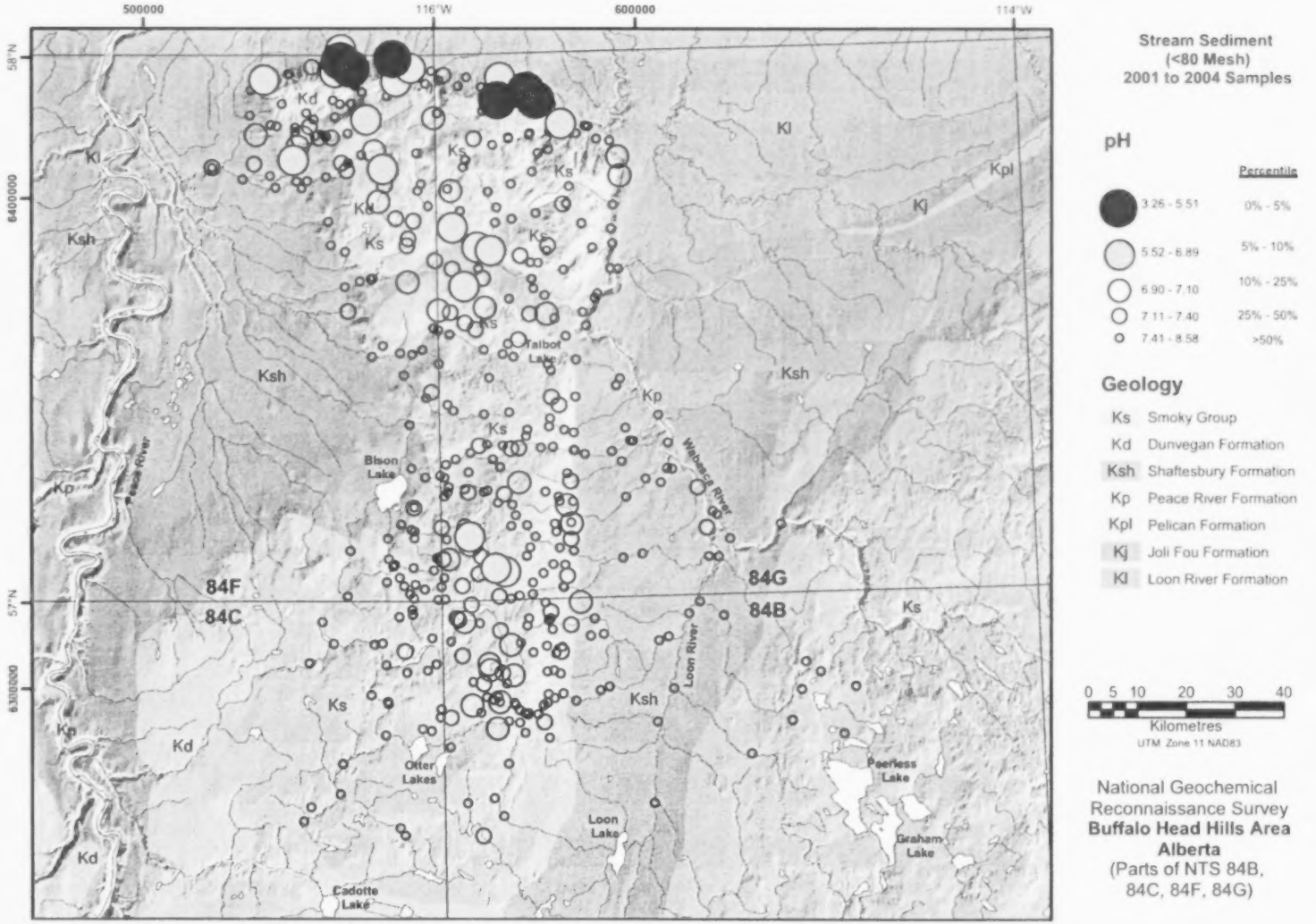

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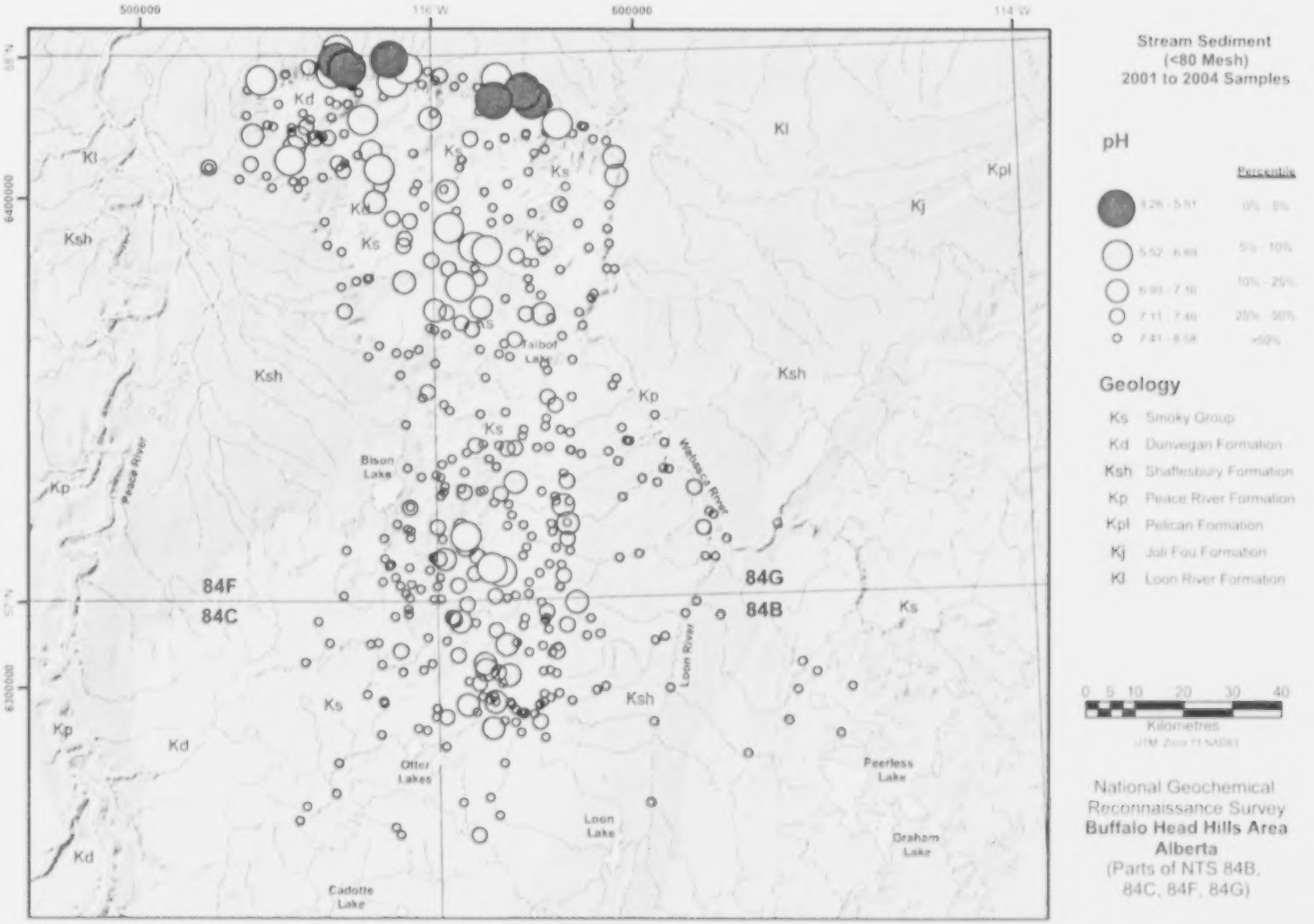


Figure 7. pH of stream water samples from the Buffalo Head Hills area.

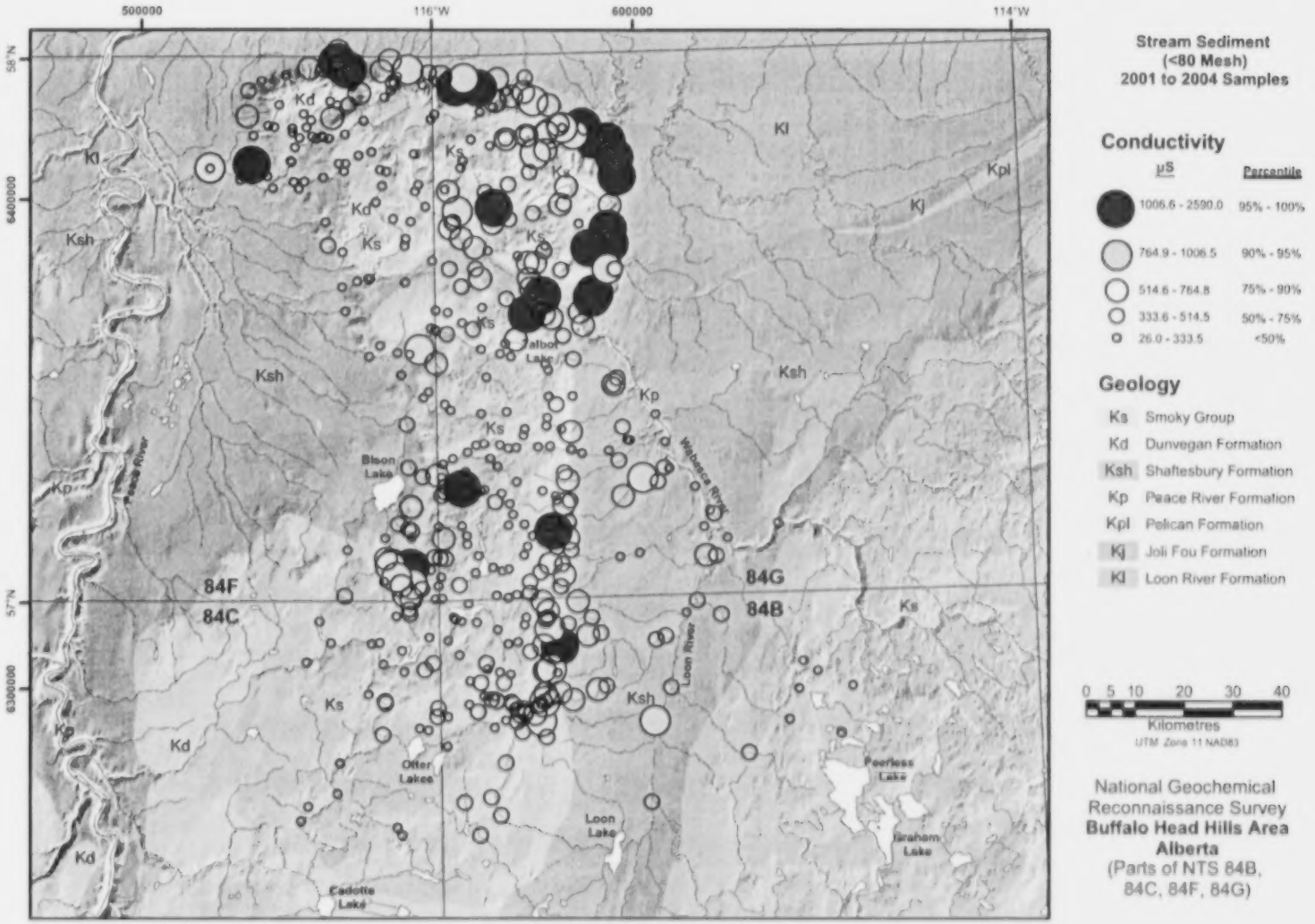


Figure 8. Conductivity of stream water samples from the Buffalo Head Hills area.

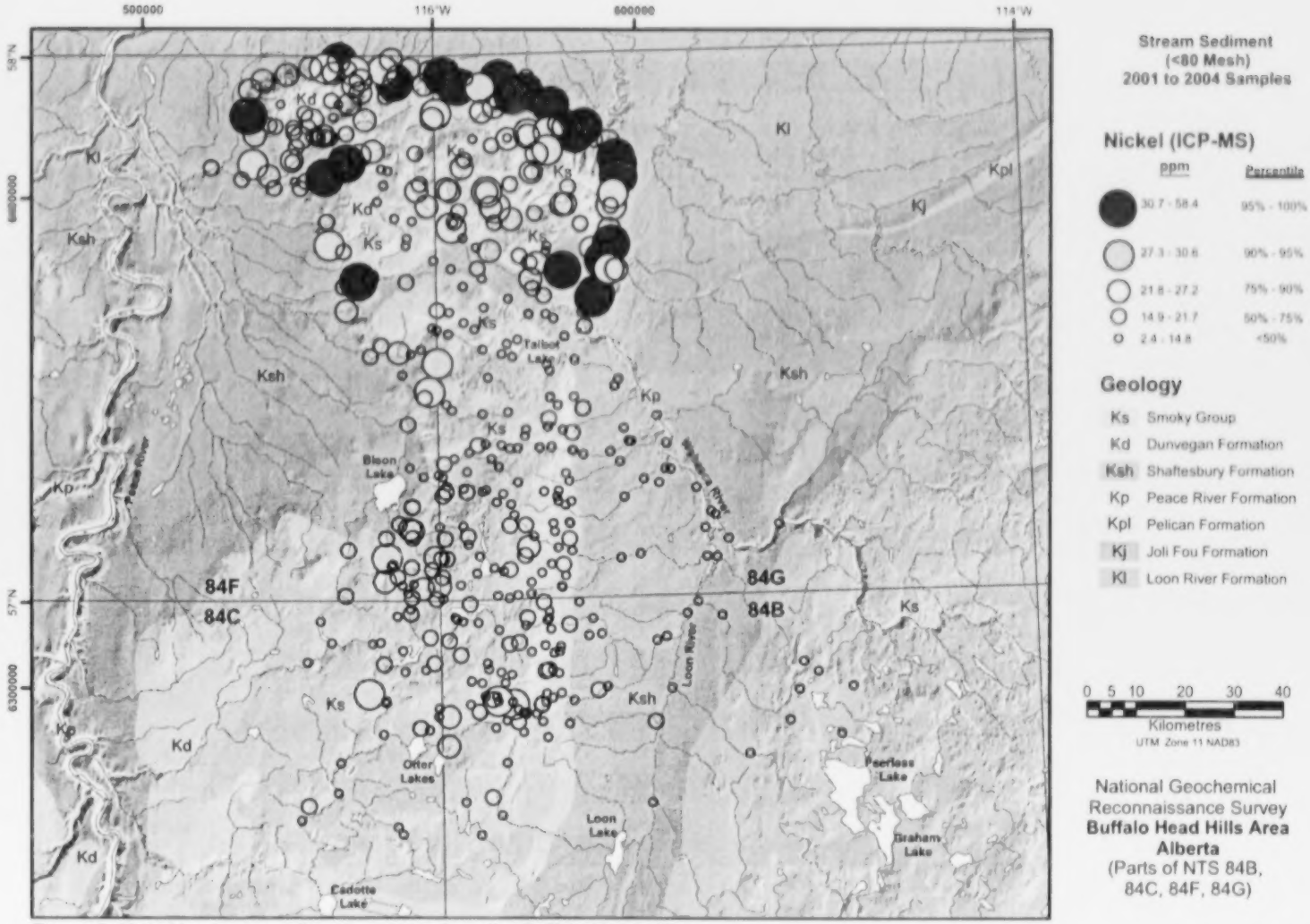
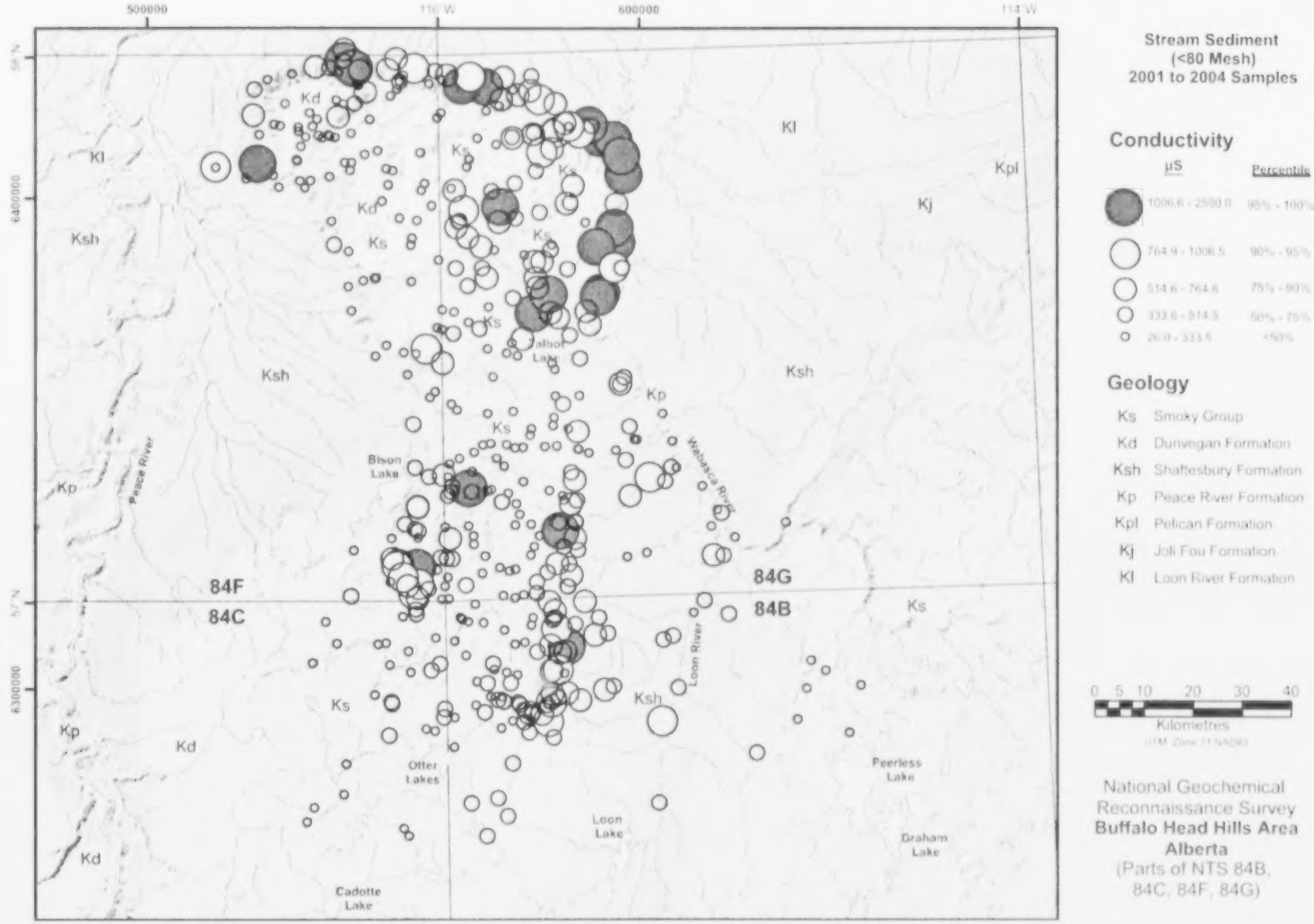


Figure 9. Nickel in stream sediment samples from the Buffalo Head Hills area.



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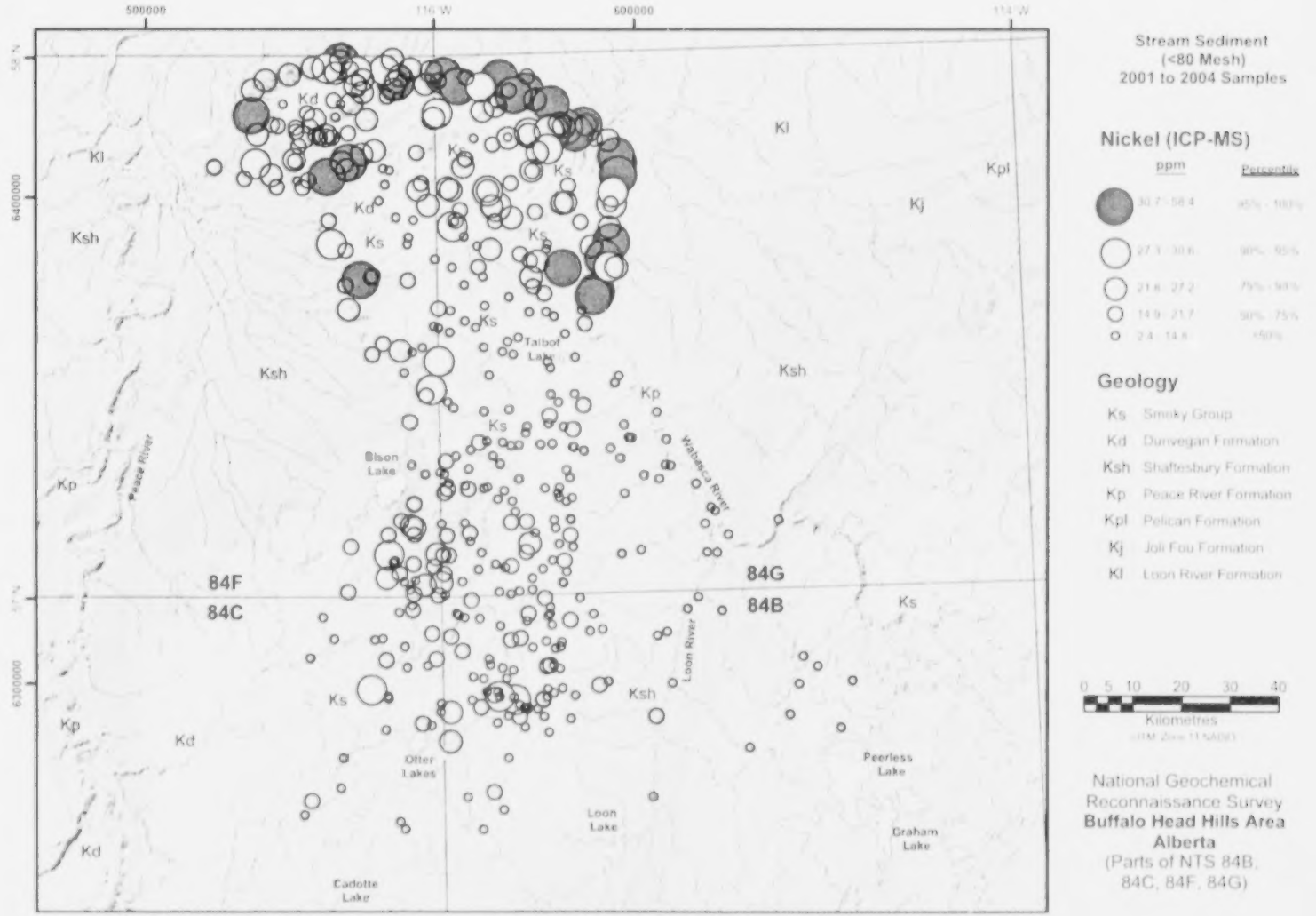

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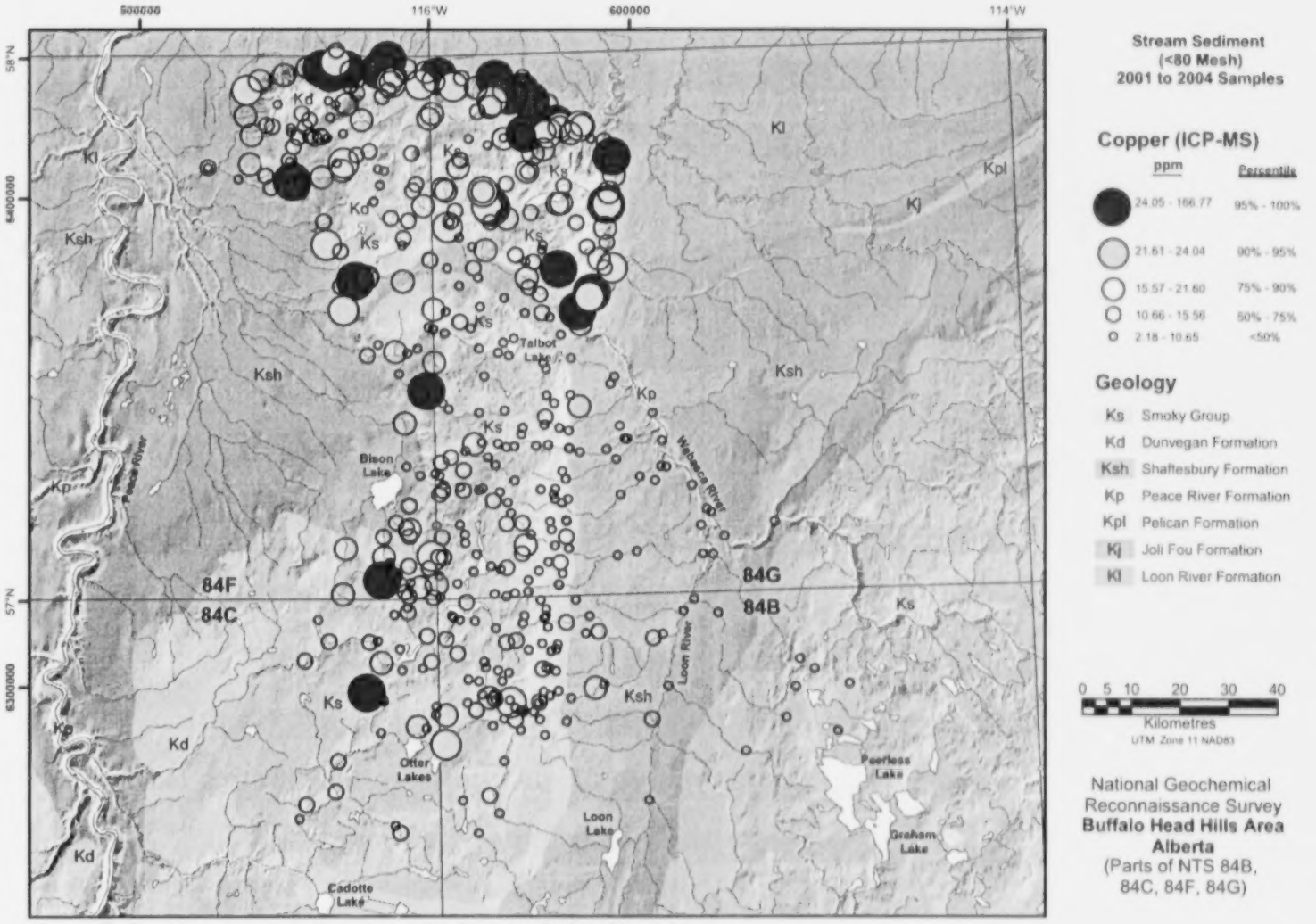


Figure 10. Copper in stream sediment samples from the Buffalo Head Hills area.

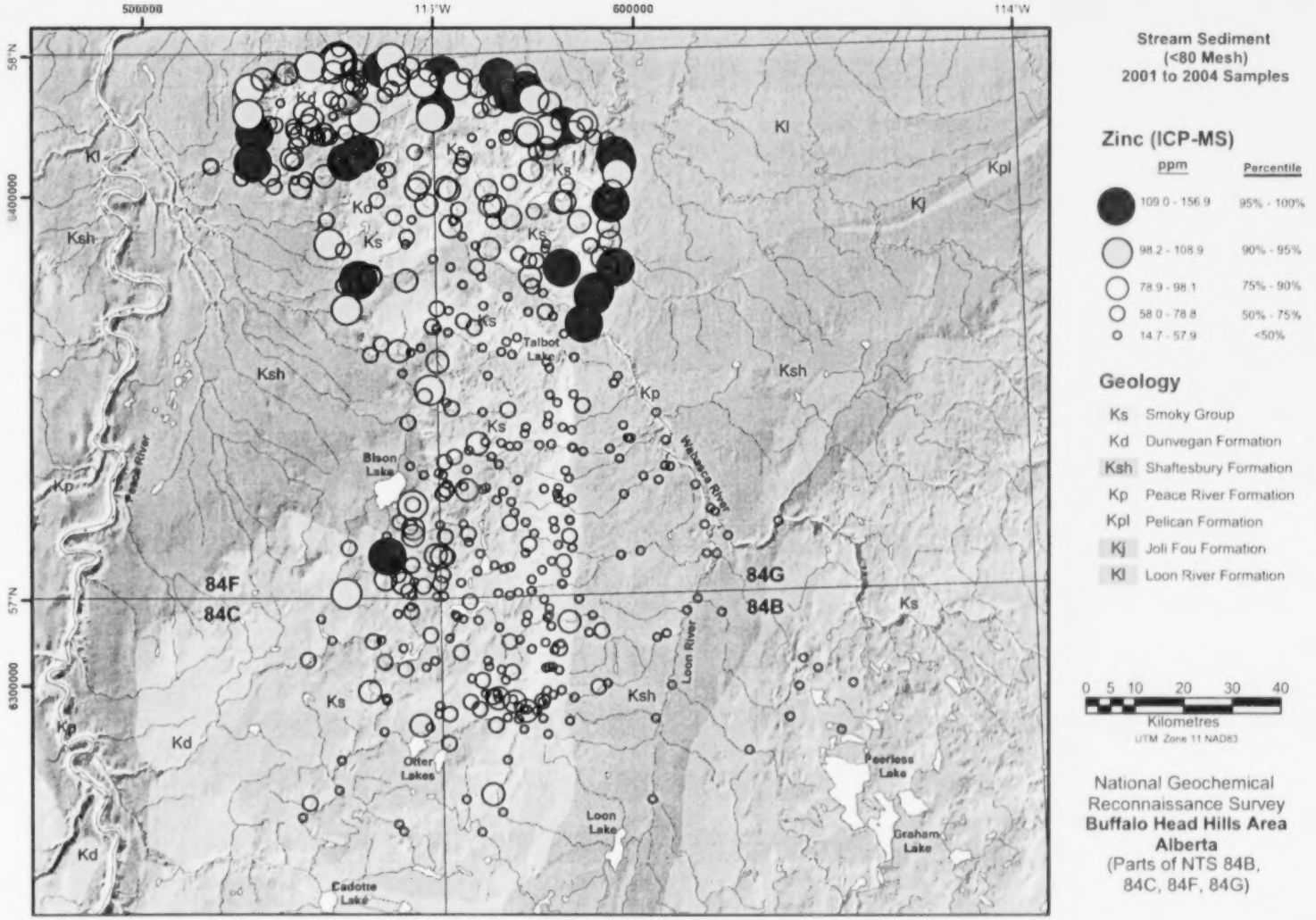


Figure 11. Zinc in stream sediment samples from the Buffalo Head Hills area.

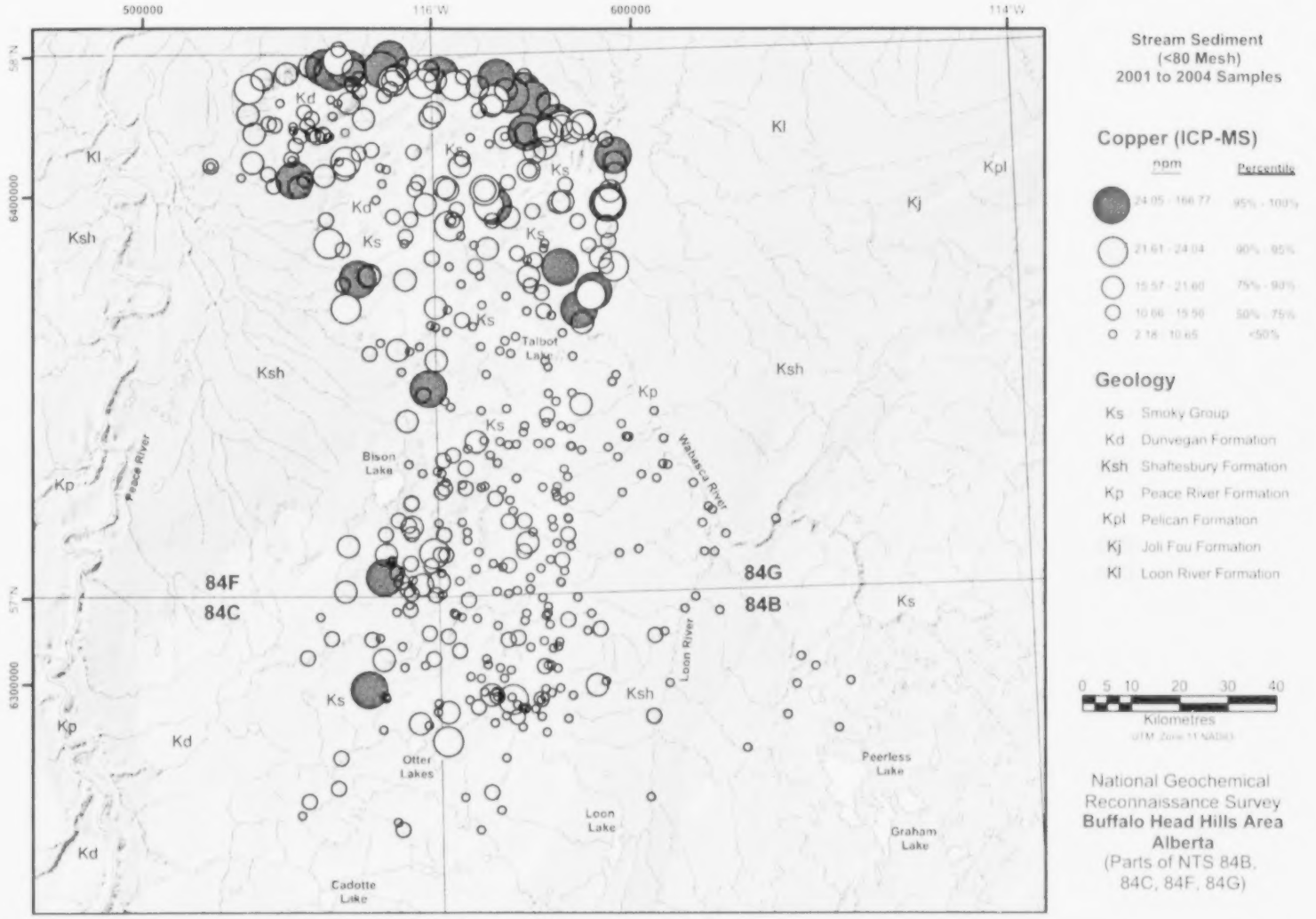


Figure 10. Copper in stream sediment samples from the Buffalo Head Hills area.

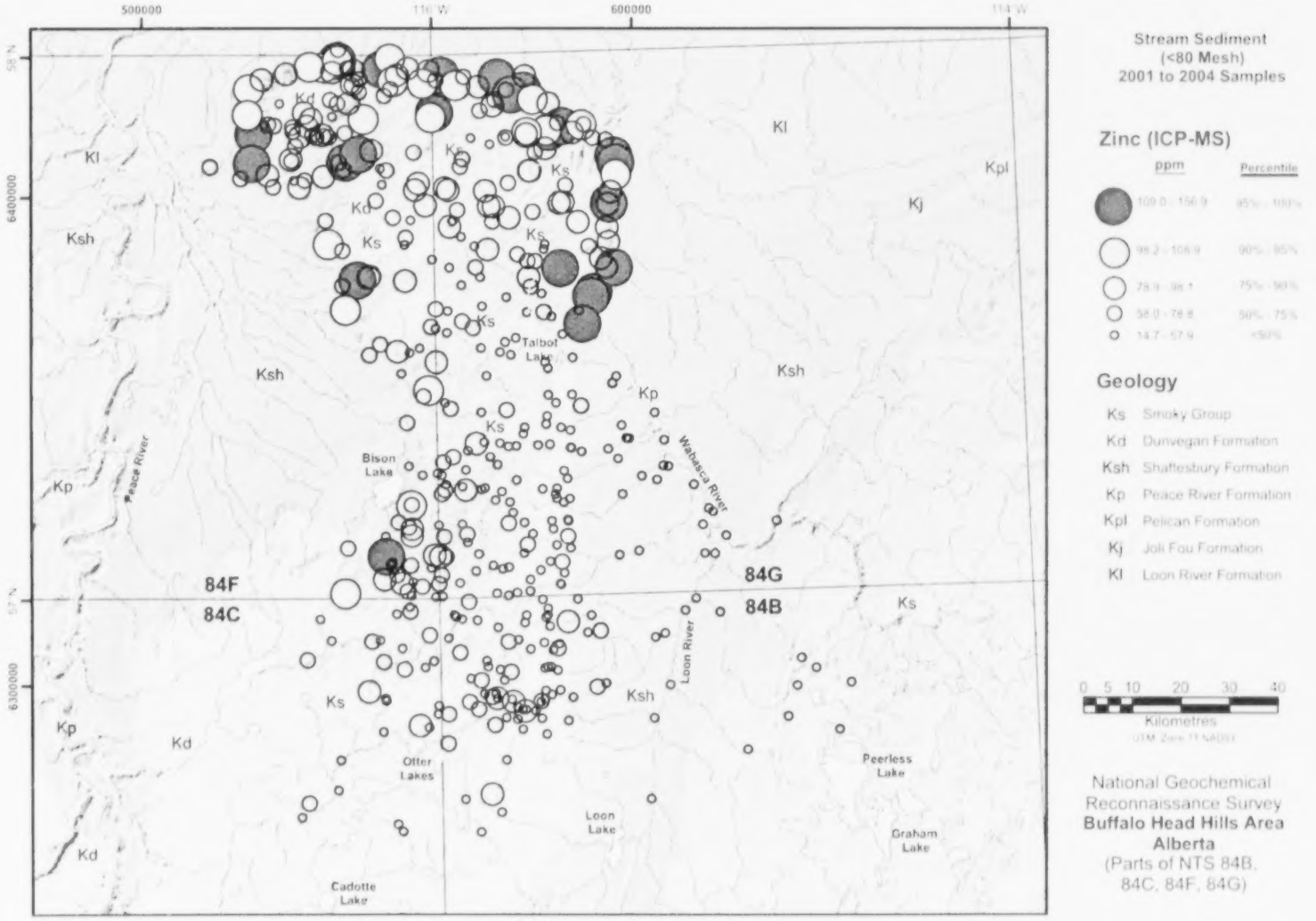


Figure 11. Zinc in stream sediment samples from the Buffalo Head Hills area.

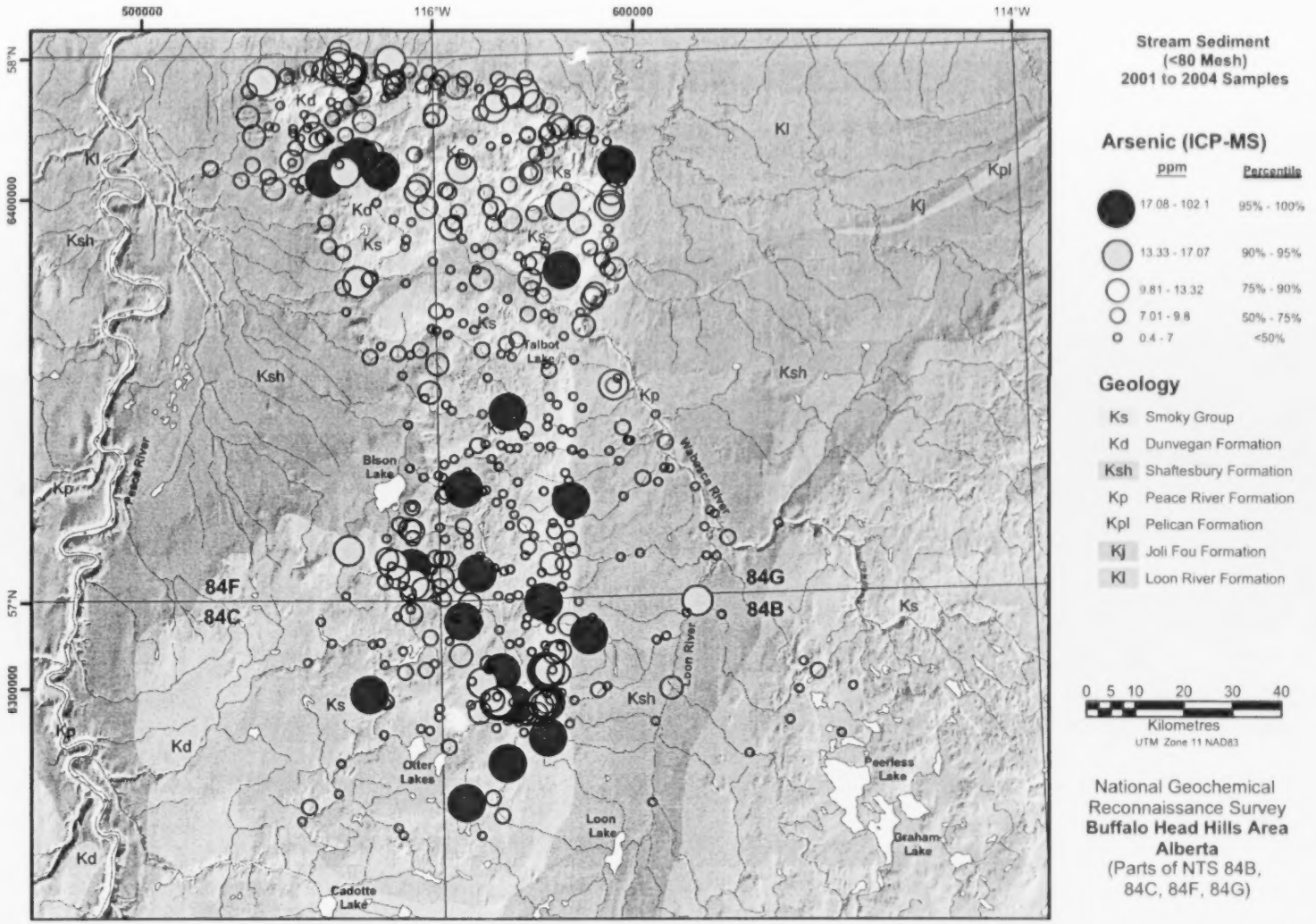
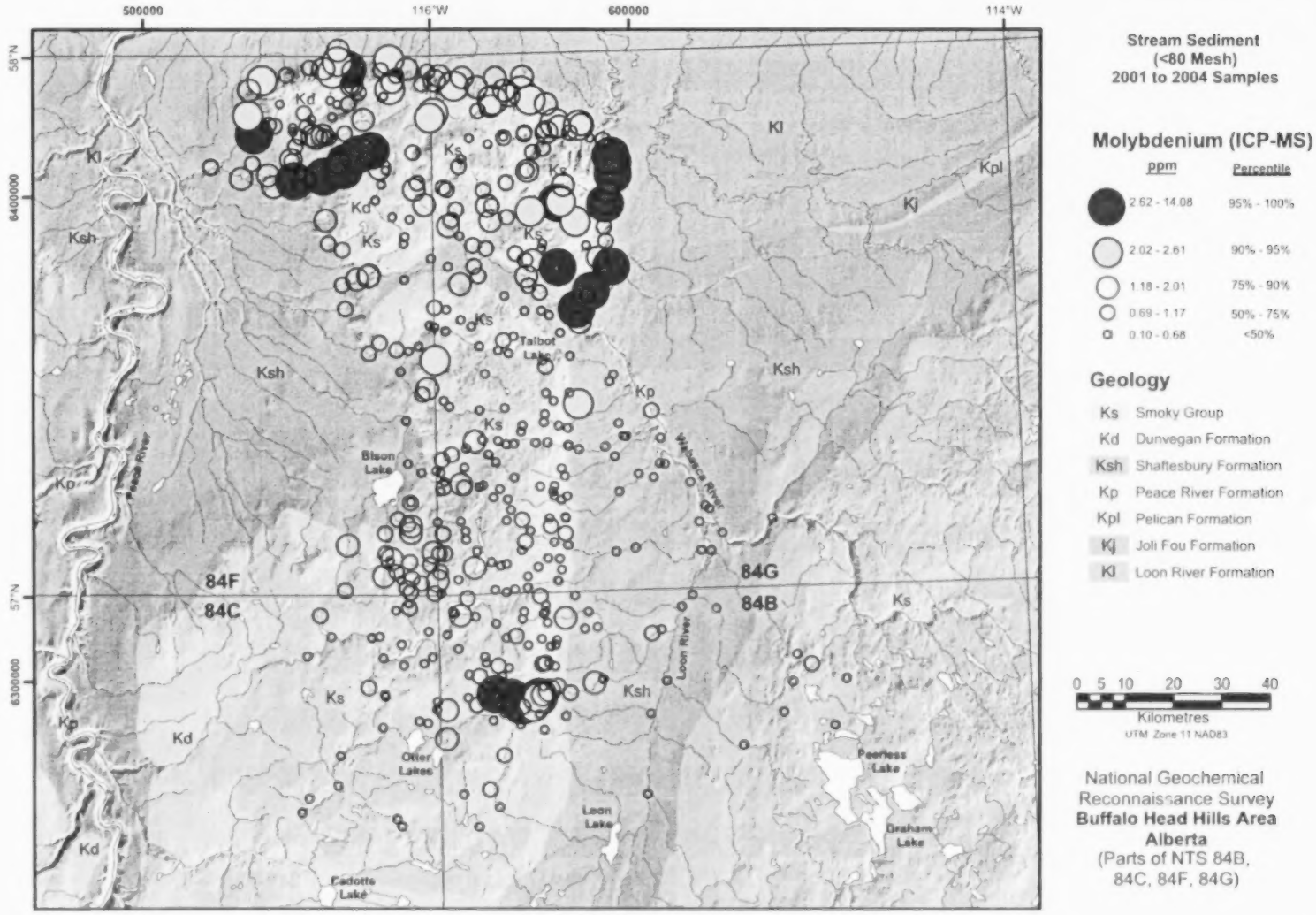


Figure 12. Arsenic in stream sediment samples from the Buffalo Head Hills area.



Stream Sediment
(<80 Mesh)
2001 to 2004 Samples

Molybdenium (ICP-MS)

ppm	Percentile
2.62 - 14.08	95% - 100%
2.02 - 2.61	90% - 95%
1.18 - 2.01	75% - 90%
0.69 - 1.17	50% - 75%
0.10 - 0.68	<50%

Geology

Ks	Smoky Group
Kd	Dunvegan Formation
Ksh	Shaftesbury Formation
Kp	Peace River Formation
Kpl	Pelican Formation
Kj	Joli Fou Formation
Kl	Loon River Formation

0 5 10 20 30 40
Kilometres
UTM Zone 11 NAD83

National Geochemical Reconnaissance Survey
Buffalo Head Hills Area
Alberta
(Parts of NTS 84B, 84C, 84F, 84G)

Figure 13. Molybdenum in stream sediment samples from the Buffalo Head Hills area.

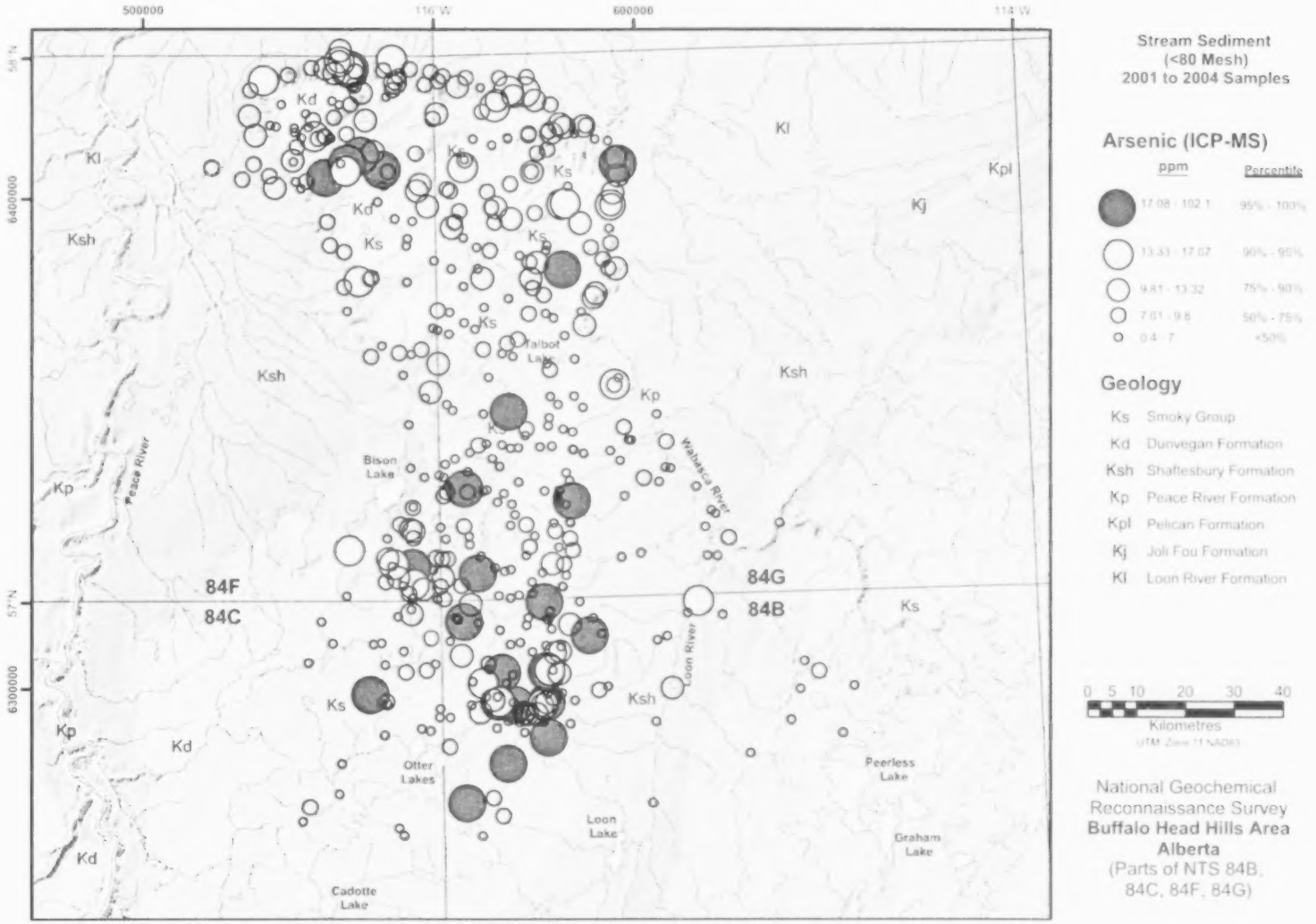


Figure 12. Arsenic in stream sediment samples from the Buffalo Head Hills area.

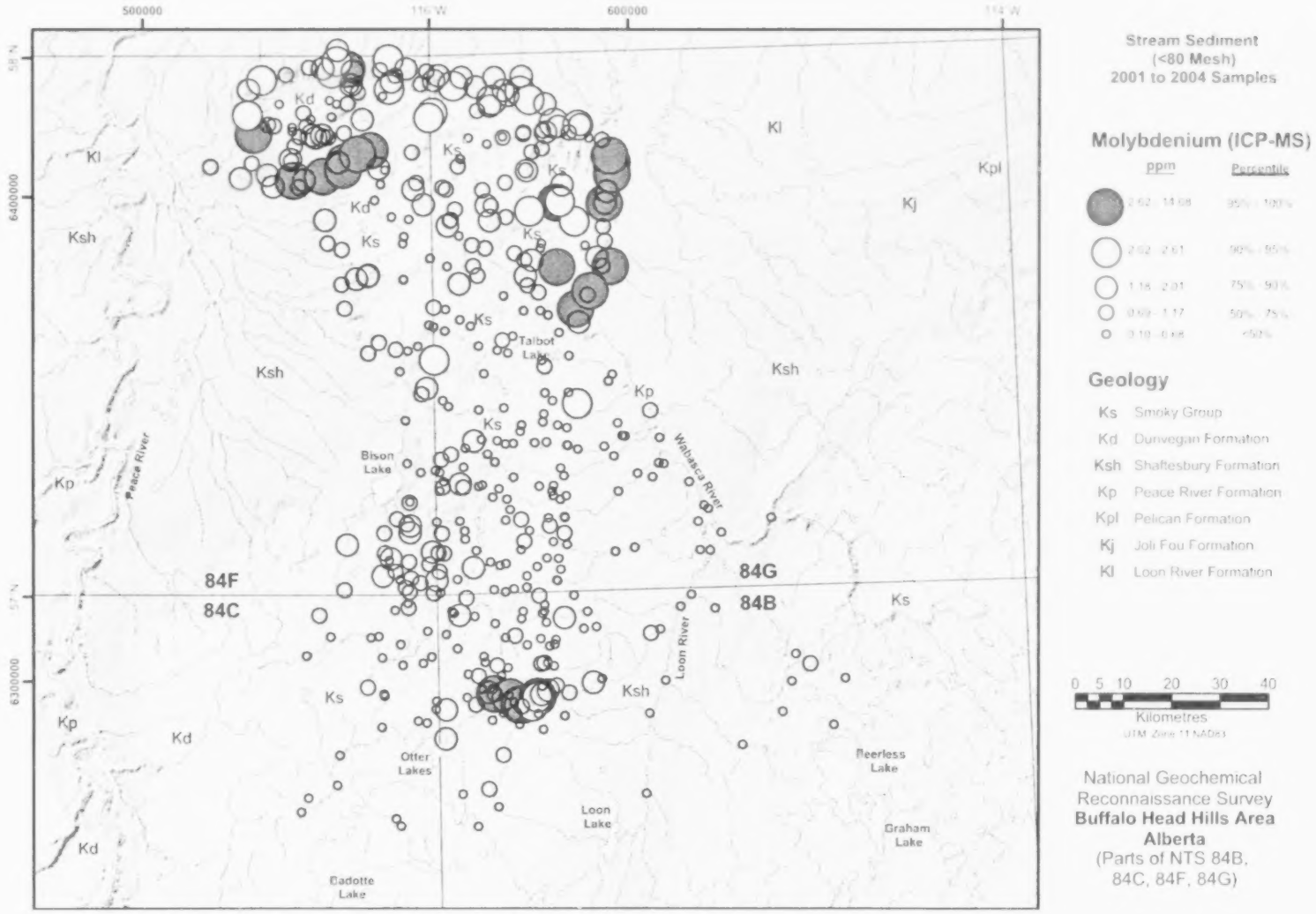


Figure 13. Molybdenum in stream sediment samples from the Buffalo Head Hills area.

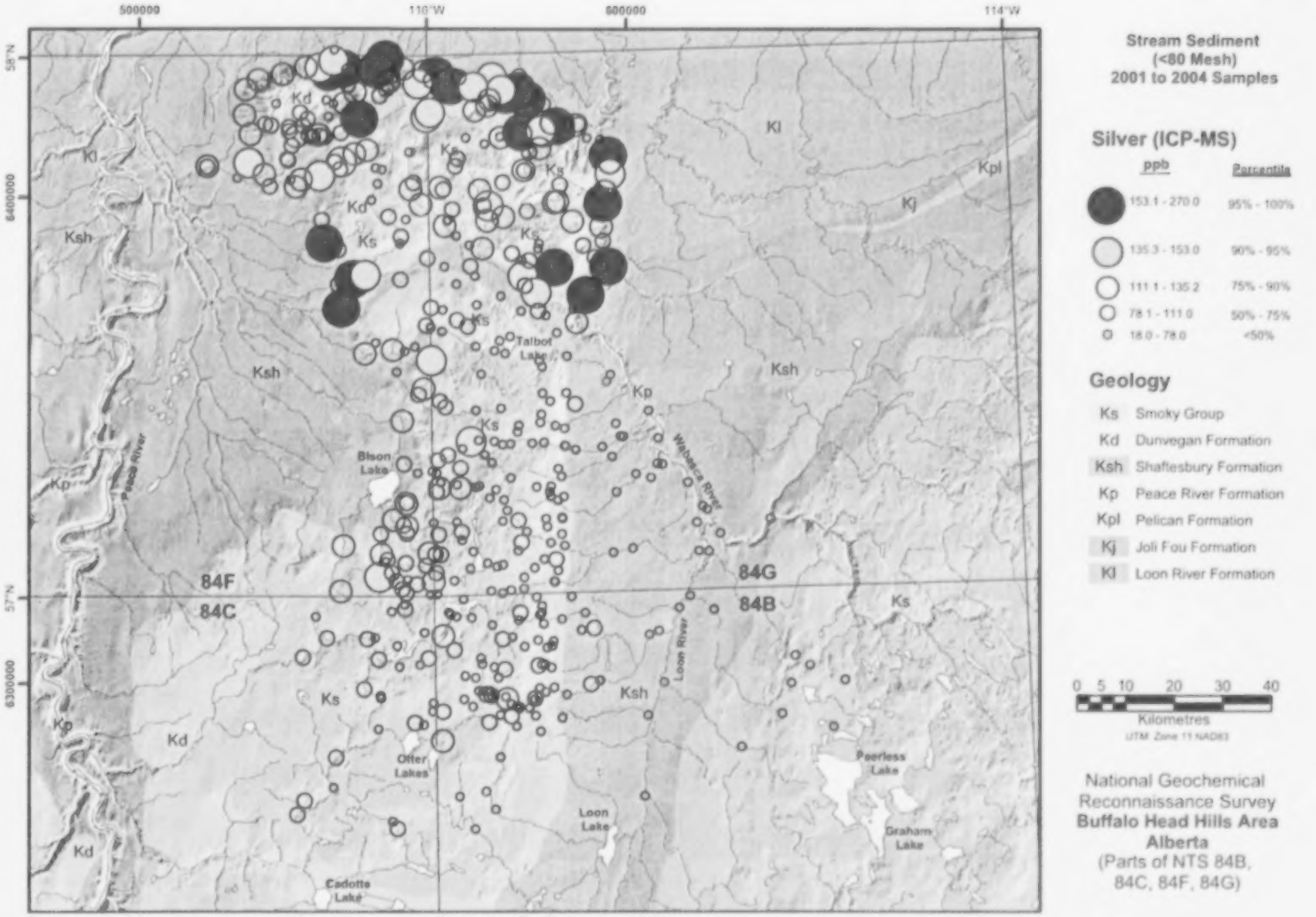


Figure 14. Silver in stream sediment samples from the Buffalo Head Hills area.

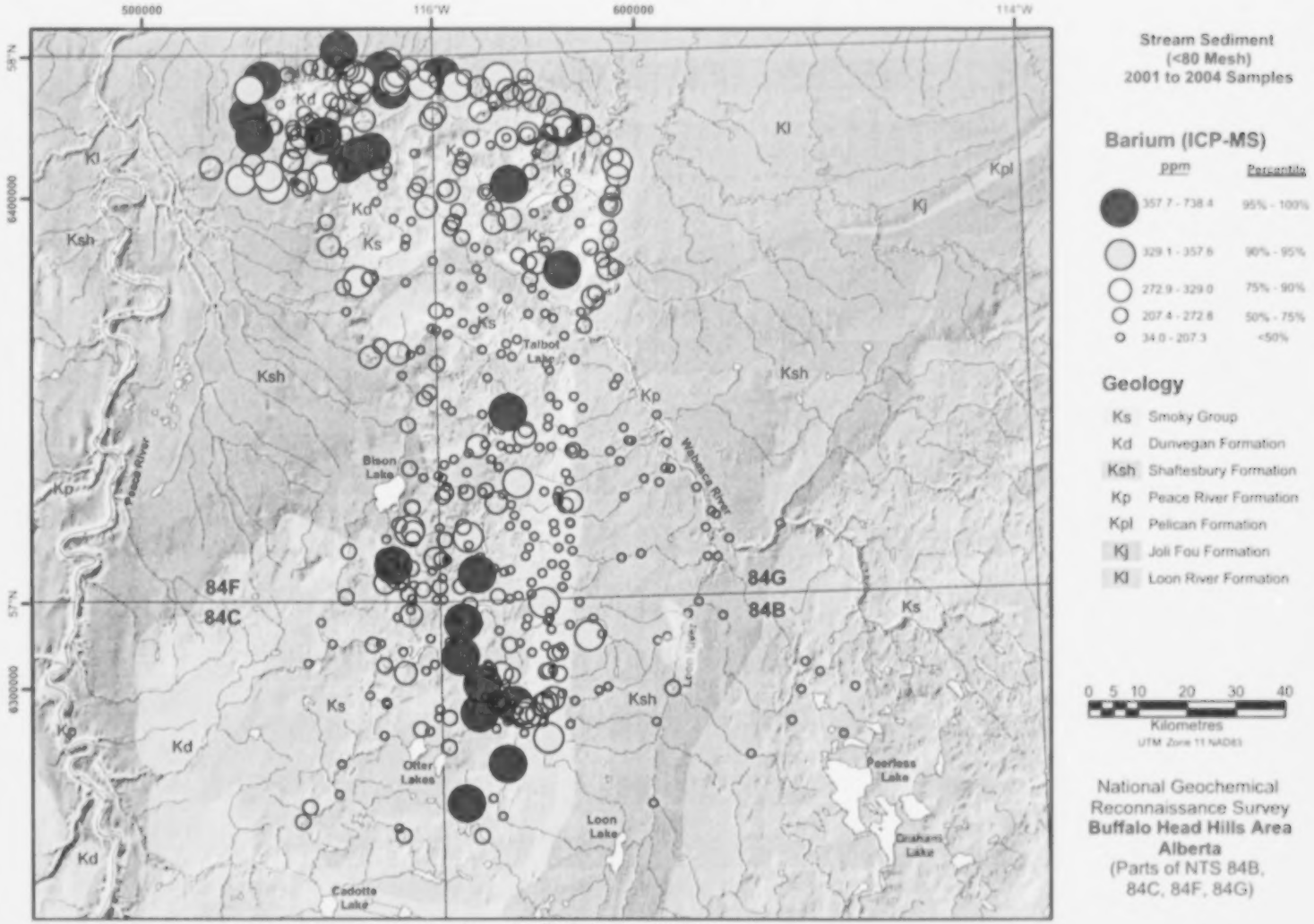


Figure 15. Barium in stream sediment samples from the Buffalo Head Hills area.

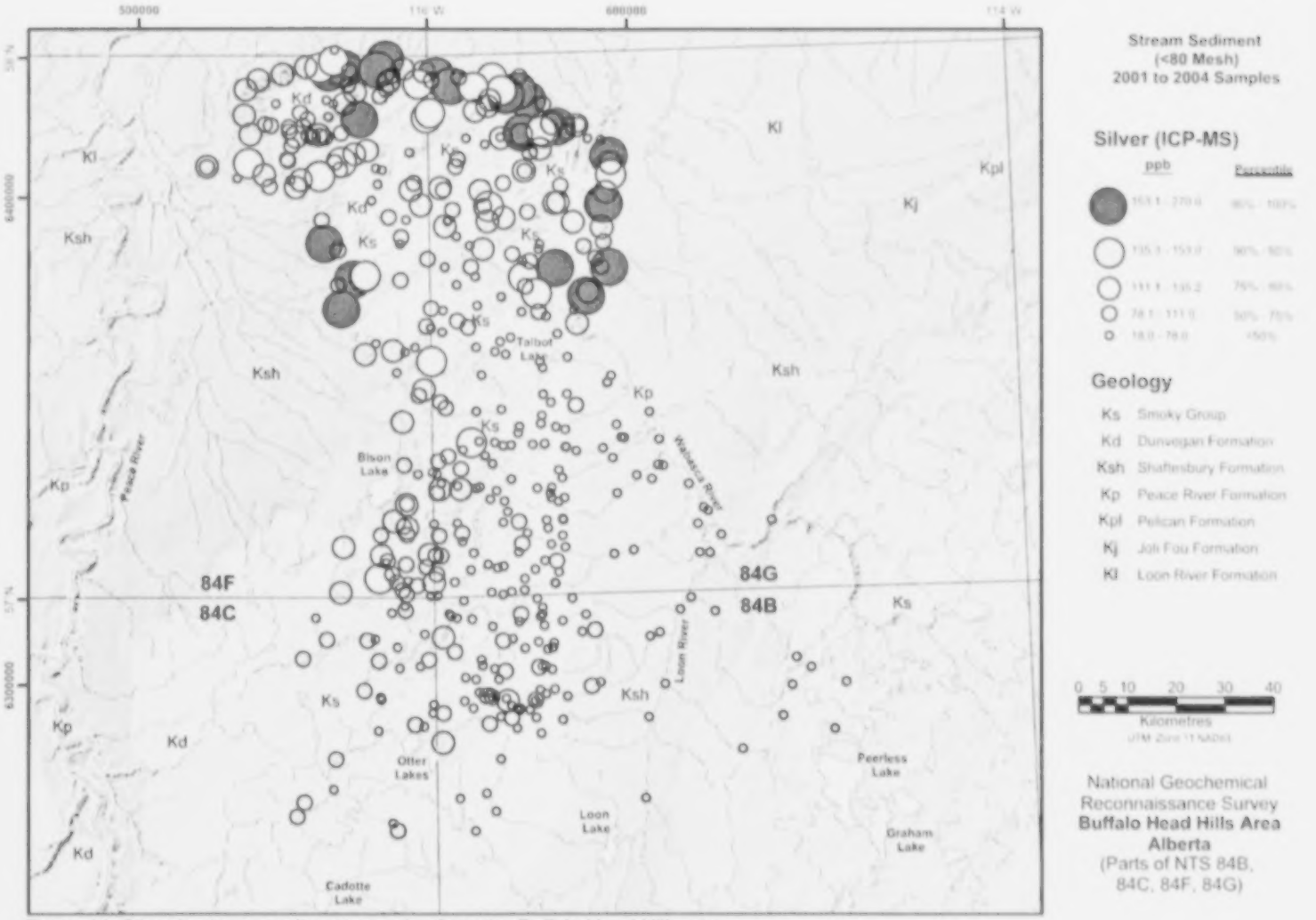


Figure 14. Silver in stream sediment samples from the Buffalo Head Hills area.

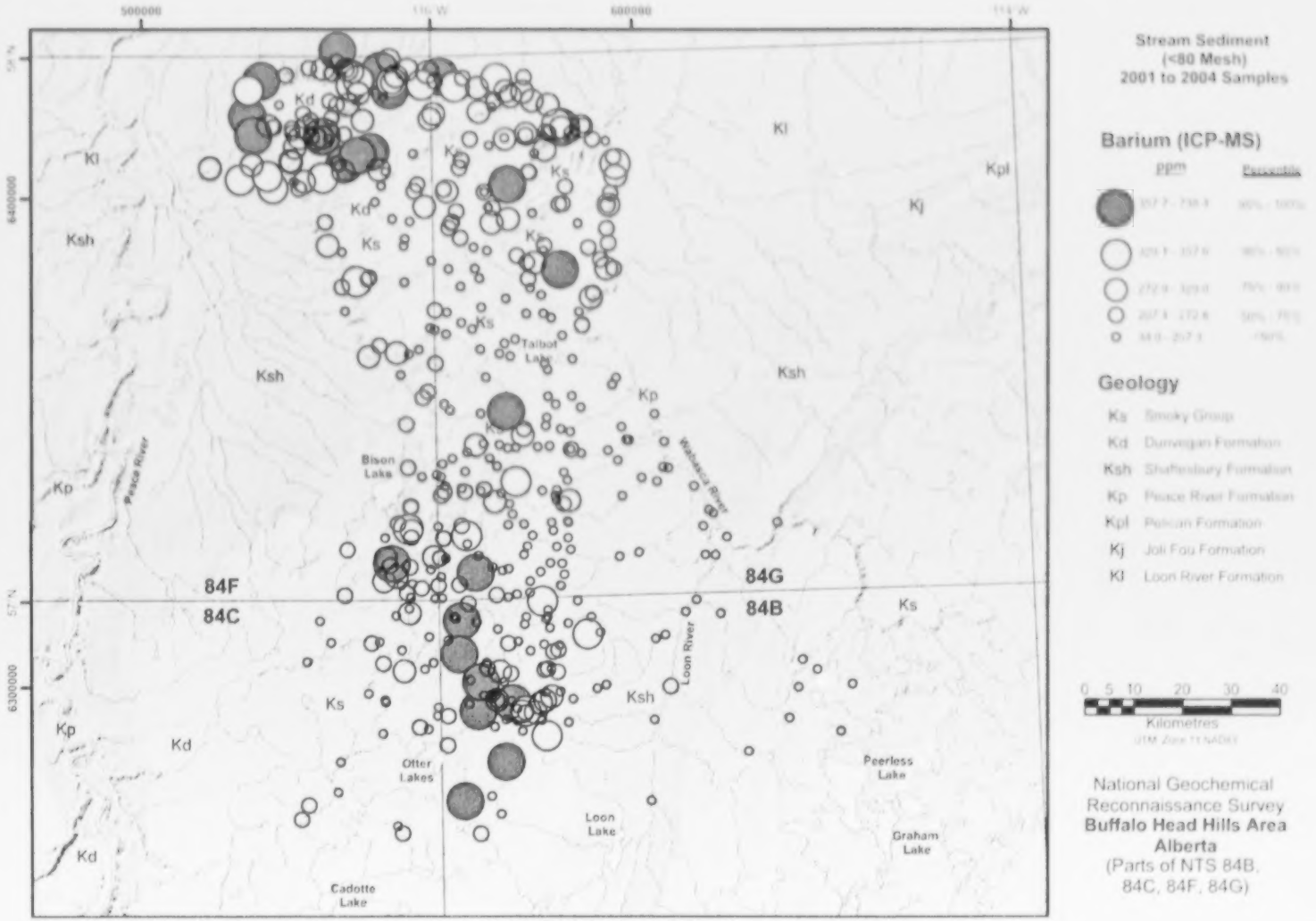


Figure 15. Barium in stream sediment samples from the Buffalo Head Hills area.

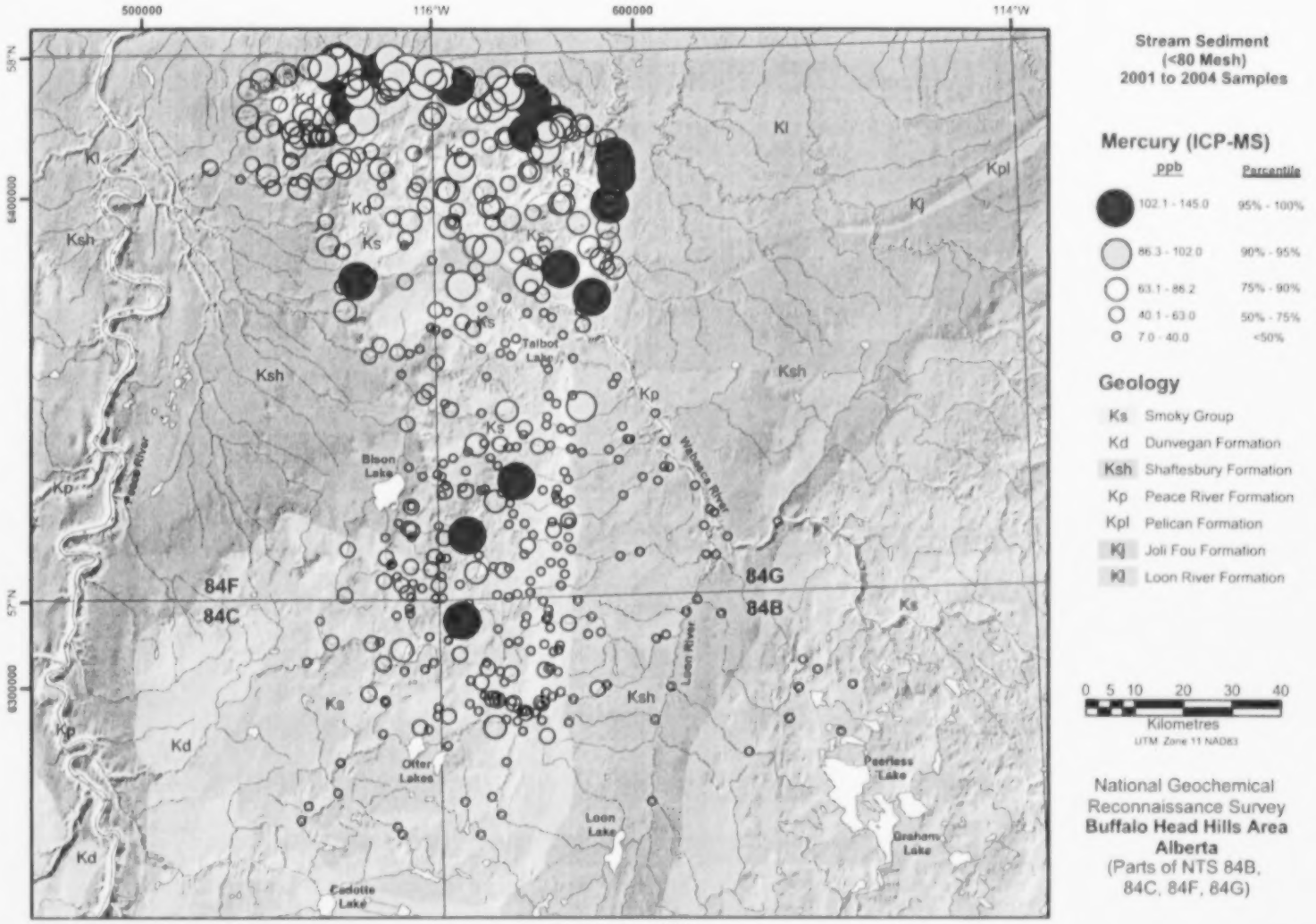


Figure 16. Mercury in stream sediment samples from the Buffalo Head Hills area.

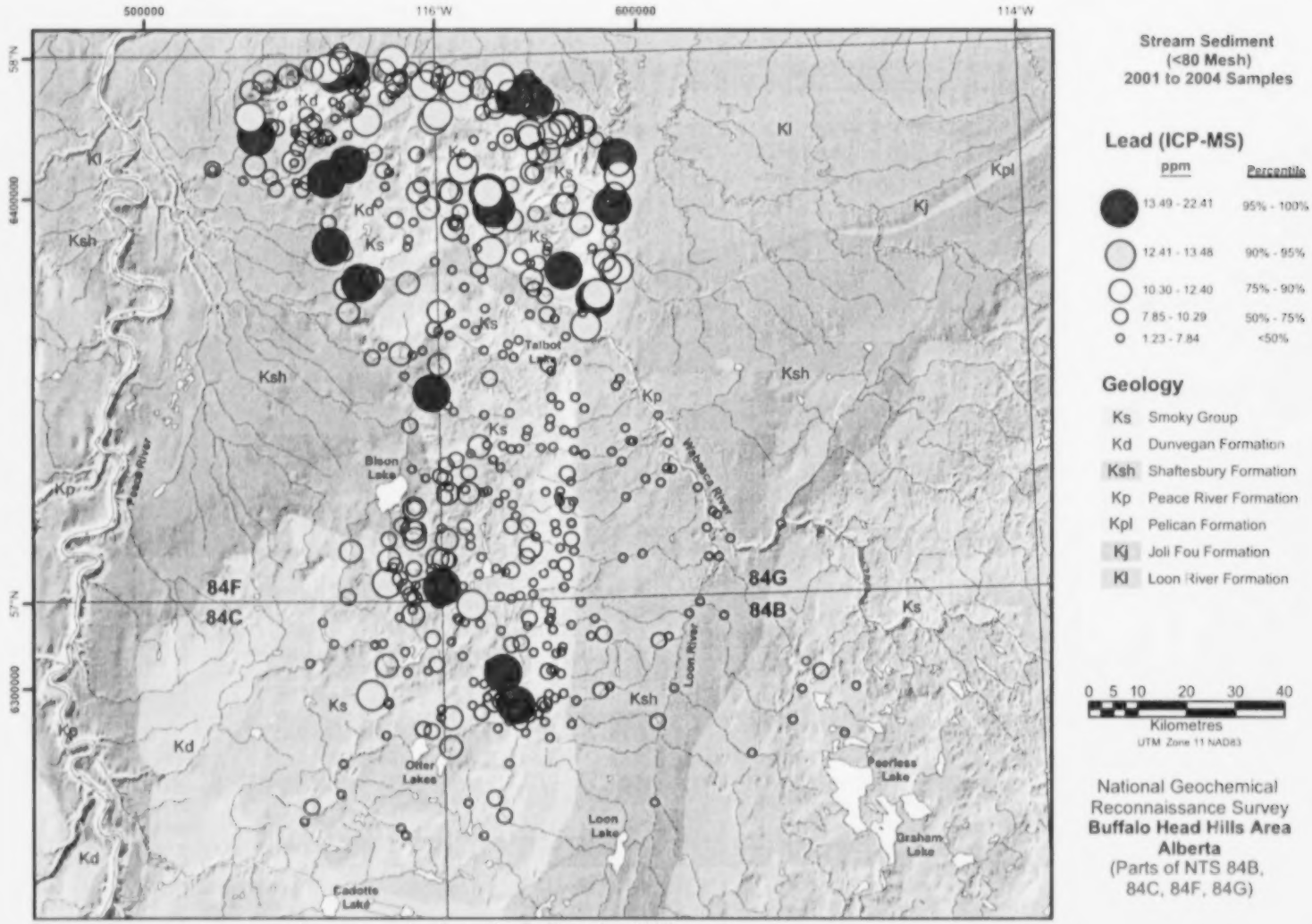


Figure 17. Lead in stream sediment samples from the Buffalo Head Hills area.

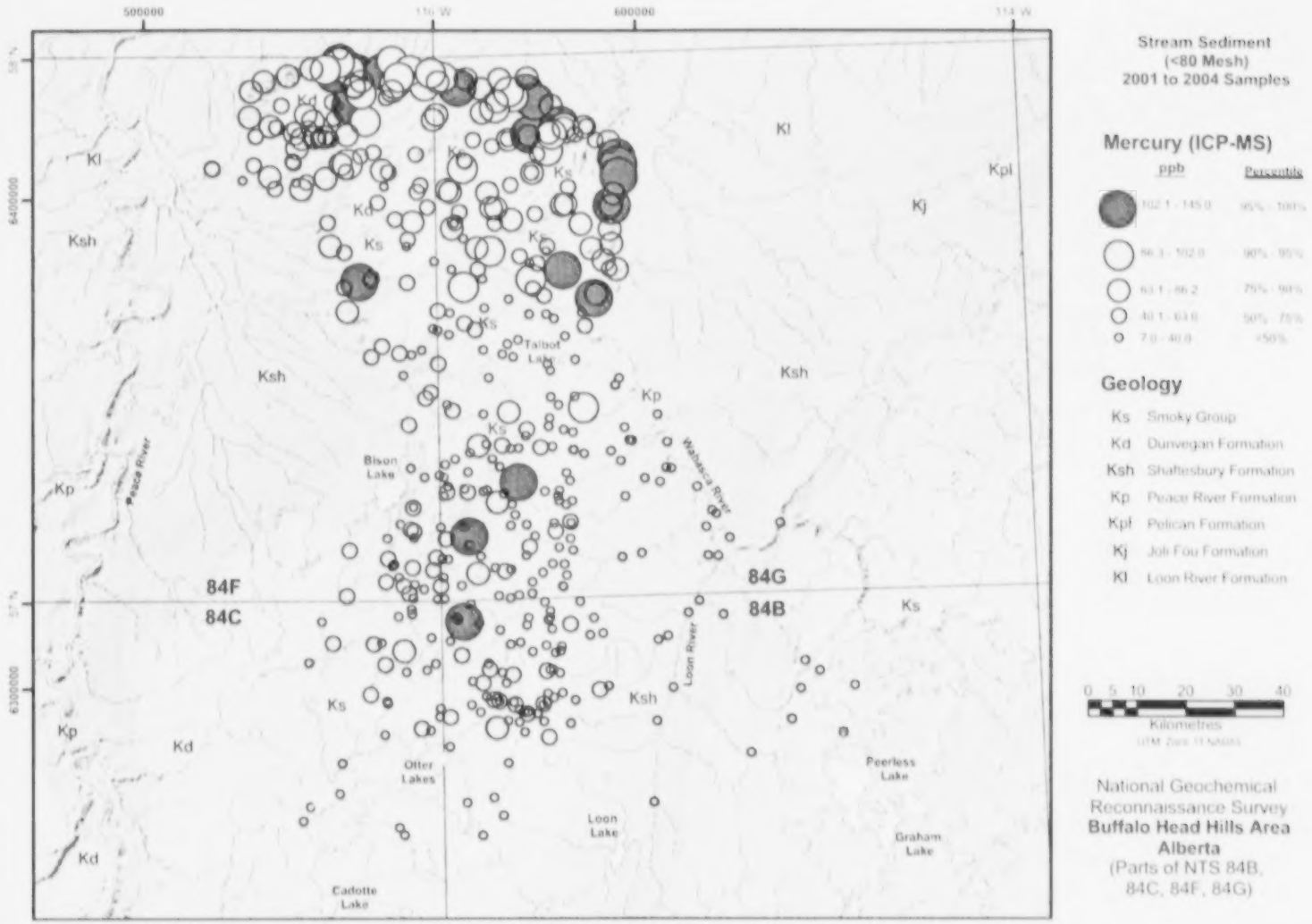


Figure 16. Mercury in stream sediment samples from the Buffalo Head Hills area.

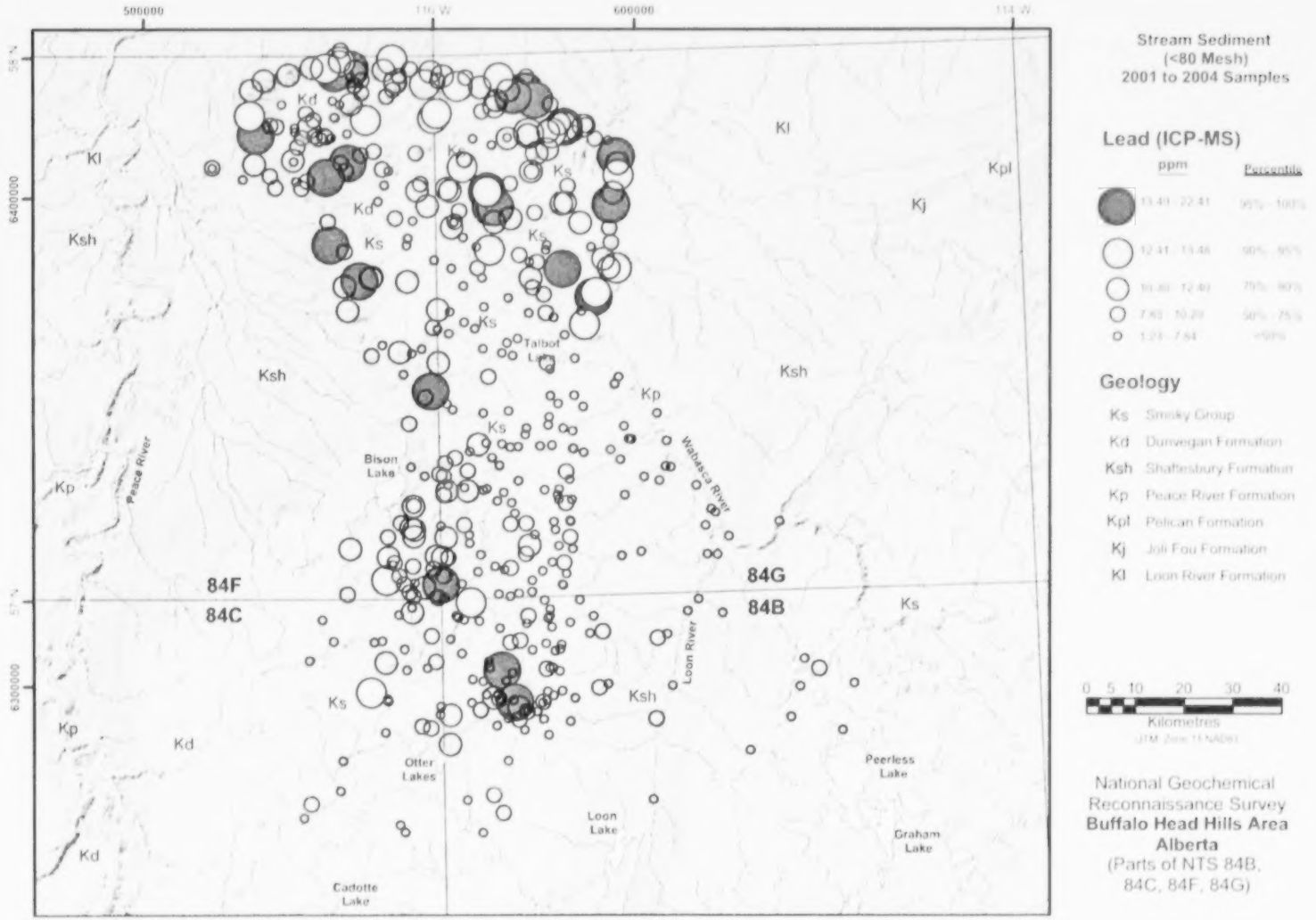


Figure 17. Lead in stream sediment samples from the Buffalo Head Hills area.

Appendix 3 – Field Data Including pH and Conductivity Measurements

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84B-2004-SS-1002	582720	6289966	27	11	382	7.84	1.8	0.2	09/29/04	Hilly	Hummocky	Dendritic	Well
84B-2004-SS-1004	574435	6284709	27	11	335	7.92	2.0	0.3	09/29/04	Hilly	Hummocky	Dendritic	Well
84B-2004-SS-1005	562553	6288005	27	11	239	7.68	2.0	0.4	09/29/04	Plain	Hummocky	Dendritic	Moderate
84B-2004-SS-2002	566079	6276590	27	11	447	7.68	0.8	0.1	09/29/04	Plain	Inclined	Dendritic	Poor
84B-2004-SS-2003	581569	6296671	27	11	313	7.71	5.0	0.7	09/30/04	Hilly	Inclined	Dendritic	Well
84C-2004-SS-1002	546379	6298566	27	11	124	7.64	1.5	0.2	09/29/04	Hilly	Hummocky, Inclined	Dendritic	Well
84C-2004-SS-1004	536390	6313358	27	11	234	7.47	0.9	0.3	09/30/04	Hilly	Hummocky	Dendritic	Well
84C-2004-SS-2002	553295	6269977	27	11	275	7.87	20.0	1.5	09/29/04	Swamp	Level	Dendritic	Poor
84C-2004-SS-2003	552267	6271477	27	11	265	8.02	3.0	0.6	09/29/04	Hilly	Inclined	Dendritic	Well
84C-2004-SS-2004	540591	6284605	27	11	332	7.71	10.0	0.4	09/29/04	Plain	Inclined	Dendritic	Moderate
84C-2004-SS-2005	540079	6278419	27	11	299	7.95	9.0	0.5	09/29/04	Plain	Inclined	Dendritic	Well
84C-2004-SS-2006	532612	6272835	27	11	313	8.05	12.0	0.4	09/29/04	Plain	Inclined	Dendritic	Well
84C-2004-SS-2007	534123	6275751	27	11	290	7.54	3.0	0.7	09/30/04	Peneplain	Hummocky	Dendritic	Poor
84C-2004-SS-2008	533815	6305015	27	11	253	7.81	8.0	0.4	09/30/04	Plain	Inclined	Dendritic	Moderate
84C-2004-SS-2009	538699	6308943	27	11	232	7.79	14.0	0.5	09/30/04	Plain	Inclined	Dendritic	Moderate

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84B-2004-SS-1002	Ground	Primary	Permanent	Moderate	Yellow	Partly Cloudy	Mixed	Colluvium	Possible - power line upstream
84B-2004-SS-1004	Ground	Primary	Permanent	Moderate	Yellow	Transparent	Coniferous	Alluvium, Colluvium	Possible - Oil and Gas
84B-2004-SS-1005	Ground	Primary	Permanent	Fast	Brown	Transparent	Coniferous, Grass	Organic	None
84B-2004-SS-2002	Ground	Primary	Permanent	Slow	Brown	Partly Cloudy	Mixed	Organic	None
84B-2004-SS-2003	Ground, Recent Rain	Primary	Permanent	Moderate			Mixed		
84C-2004-SS-1002	Ground, Recent Rain/Snow	Primary	Permanent	Fast			Coniferous	Alluvium, Till	Possible
84C-2004-SS-1004	Ground	Primary	Permanent	Moderate	Yellow	Transparent	Coniferous	Colluvium	Possible - Forestry
84C-2004-SS-2002	Ground, Recent Rain	Primary	Permanent	Slow	Brown	Partly Cloudy	Grass	Organic	Possible - Oil or gas pipeline
84C-2004-SS-2003	Ground, Recent Rain	Primary	Permanent	Fast	Slightly Red-Brown	Transparent	Mixed	Alluvium	None
84C-2004-SS-2004	Ground, Recent Rain	Secondary	Permanent	Moderate	Light Yellow Brown	Transparent	Mixed	Alluvium	None
84C-2004-SS-2005	Ground, Recent Rain	Secondary	Permanent	Moderate	Light Yellow Brown	Transparent	Coniferous	Outwash (sandy)	None
84C-2004-SS-2006	Ground, Recent Rain	Secondary	Permanent	Moderate	None	Transparent	Coniferous	Outwash (sandy)	None
84C-2004-SS-2007	Ground, Recent Rain	Primary	Permanent	Slow	Brown	Partly Cloudy	Grass	Colluvium, Organic	None
84C-2004-SS-2008	Ground, Recent Rain	Secondary	Permanent	Moderate	None	Transparent	Coniferous	Till	None
84C-2004-SS-2009	Ground, Recent Rain	Secondary	Permanent	Slow	Light Red-Brown	Transparent	Mixed	Outwash (sandy, silty)	None

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84B-2004-SS-1002	No	Black	Dark Brown	25/70/5	Limestone(5), Sandstone(5), Mudstone(5), Igneous/Metamorphic(85)	Old beaver meadow
84B-2004-SS-1004	No	Black and Red		30/60/10	Carbonate(2), Sandstone(3), Mudstone(5), Igneous/Metamorphic(90)	Sampled below beaver dam, bottom precipitate black on upper rocks, red below
84B-2004-SS-1005	No	Black	Greyish Brown	80,20,0	Black Chert(1), Carbonate(3), Mudstone(3), Sandstone(3), Igneous/Metamorphic(90)	Beaver meadow site
84B-2004-SS-2002	No	Black	Grey-Brown	35,55,10	Granitoids(50), Sandstone(20), Limestone(25), Others(5)	Orange-brown organics on stream bed, old beaver dam site
84B-2004-SS-2003	No					Creek south of K4 kimberlite
84C-2004-SS-1002	No	Red	Brown-Grey		Tertiary quartzite gravel, Sandstone, Mudstone, Limestone, Igneous/Metamorphic	Evidence of recent flood (trees uprooted, banks freshly cut and collapsed), Tertiary quartzite clasts (well-rounded) present
84C-2004-SS-1004	No	Black and Red	Brown	50,45,5	Black Chert(1), Limestone(1), Sandstone(2), Mudstone(2), Igneous/Metamorphic(94)	Overnight snow, temperature remains below freezing
84C-2004-SS-2002	No	No				Silt sample only, too deep for HMC (2 m), multiple beaver dams, sampled top of beaver dam for silt
84C-2004-SS-2003	No	No	Brown	50,50,0	Granitoid(80), Limestone(20)	Numerous beaver dams along stream
84C-2004-SS-2004	No	Black	Grey-Brown	20,70,10	Granitoids(70), Sandstone(20), Limestone(10)	600 m upstream of target
84C-2004-SS-2005	No	No	Grey Brown	75,25,0		Sandy outwash, no HMC sample (too deep and lack of gravel)
84C-2004-SS-2006	No	Black	Dark Grey	40,35,25	Granitoid(50), dark grey Sandstone(30), Limestone(10), Others(10)	
84C-2004-SS-2007	No	No	Dark Grey	20,60,20		Abandoned HMC site - silt sample only, sampled between beaver dams
84C-2004-SS-2008	No	No	Brown	20,75,5	Granitoids(60), Sandstone(20), Limestone(20)	Cadotte Creek, longitudinal bar ~10 cm thick atop clay-rich till
84C-2004-SS-2009	No	No			Granitoid(50), Sandstone(30), Limestone(20)	Longitudinal bar downstream of beaver dam, sand-rich, no pebbles >2 cm, snowing again

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84C-2004-SS-2010	547045	6308780	27	11	224	7.89	14.0	0.3	09/30/04	Plain	Level	Dendritic	Poor
84C-2004-SS-2011	549427	6304636	27	11	220	7.86	9.0	0.2	09/30/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-1002	531182	6403153	27	11	213	7.72	15.0	0.3	09/16/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1003	533347	6403237	27	11	265	7.8	1.0	0.1	09/16/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-1004	532240	6401782	27	11	311	7.74	1.0	0.4	09/16/04	Swamp	Hummocky	Dendritic	Poor
84F-2004-SS-1005	525809	6404293	27	11	146	7.7	12.0	0.6	09/17/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1007	522625	6406660	27	11	1118	7.26	0.7	0.1	09/17/04	Swamp	Hummocky	Dendritic	Moderate
84F-2004-SS-1008	527185	6414389	27	11	116	7.53	0.5	0.1	09/17/04	Hilly	Hummocky	Dendritic	Moderate
84F-2004-SS-1009	525945	6414649	27	11	291	8.02	2.5	0.2	09/17/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-1010	528230	6418919	27	11	132	7.59	0.7	0.4	09/17/04	Plain	Hummocky	Dendritic	Well
84F-2004-SS-1011	546963	6409341	27	11	77	7.01	4.0	0.7	09/20/04	Swamp	Level	Dendritic	Moderate
84F-2004-SS-1012	544334	6408565	27	11	165	7.52	7.0	0.4	09/20/04	Plain	Hummocky	Dendritic	Moderate
84F-2004-SS-1013	537219	6412306	27	11	194	7.91	1.0	0.1	09/20/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1014	537032	6412477	27	11	314	7.92	1.0	0.1	09/20/04	Hilly	Hummocky	Dendritic	Moderate
84F-2004-SS-1016	530949	6413238	27	11	177	7.88	6.0	0.5	09/20/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1017	530870	6414117	27	11	189	7.89	3.5	0.5	09/20/04	Hilly	Hummocky	Dendritic	Well

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84C-2004-SS-2010	Ground, Recent Rain	Secondary	Permanent	Slow	None	Transparent	Mixed	Colluvium	None
84C-2004-SS-2011	Ground, Recent Rain	Secondary	Permanent	Slow	None	Transparent	Coniferous		None
84F-2004-SS-1002	Ground, Recent Rain	Secondary	Permanent	Fast	Brown	Transparent	Mixed	Alluvium, Colluvium, Till	Possible - Cutlines
84F-2004-SS-1003	Ground	Primary	Permanent	Fast	Brown	Partly Cloudy	Mixed	Alluvium, Colluvium, Till	None
84F-2004-SS-1004	Ground, Recent Rain	Primary	Permanent	Moderate	None	Transparent	Grass	Colluvium, Organic	None
84F-2004-SS-1005	Ground, Recent Rain	Secondary	Permanent	Moderate	Brown	Transparent	Mixed	Alluvium, Colluvium, Outwash	None
84F-2004-SS-1007	Ground	Primary	Intermittent	Slow	None	Transparent	Grass	Alluvium, Colluvium, Organic	None
84F-2004-SS-1008	Ground	Primary	Permanent	Slow	None	Transparent	Coniferous	Colluvium	Possible - Forestry
84F-2004-SS-1009	Ground, Recent Rain	Primary	Permanent	Fast	None	Transparent	Mixed	Alluvium, Colluvium, Outwash	Possible - Forestry
84F-2004-SS-1010	Ground	Primary	Permanent	Slow	None	Transparent	Mixed	Alluvium, Colluvium	Possible - Forestry
84F-2004-SS-1011	Ground, Recent Rain	Primary	Permanent	Slow	Yellow	Transparent	Grass	Colluvium, Organic	None
84F-2004-SS-1012	Ground, Recent Rain	Secondary	Permanent	Fast	Yellow	Transparent	Mixed	Alluvium, Colluvium	Possible - Cutlines
84F-2004-SS-1013	Ground, Recent Snow	Primary	Permanent	Moderate	None	Partly Cloudy	Mixed	Alluvium, Colluvium	None
84F-2004-SS-1014	Ground, Recent Snow	Primary	Permanent	Moderate	Yellow	Transparent	Mixed	Alluvium, Colluvium	None
84F-2004-SS-1016	Ground, Recent Snow	Secondary	Permanent	Moderate	Yellow	Transparent	Mixed	Alluvium, Colluvium	Possible - Forestry
84F-2004-SS-1017	Ground, Recent Snow	Primary	Permanent	Fast	None	Transparent	Mixed	Alluvium, Colluvium	Possible - Forestry

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84C-2004-SS-2010	No	Black	Brown and Grey	25,50,25	Granitoids(50), Sandstone(30), Limestone(20)	Cadotte Creek
84C-2004-SS-2011	No	No	Dark Grey	25,50,25	Granitoids(70), Sandstone(20), Limestone(10)	Site ~2.5 km upstream of target (no landings), ~15 cm gravel atop grey clay-rich till
84F-2004-SS-1002	No	No	Brown	20,60,20	Granitic Gneiss(75), Sandstone(15), Quartzite(10)	
84F-2004-SS-1003	No	Red-Brown	Brown	20,80,0		
84F-2004-SS-1004	No	No	Grey Black	15,75,10	Granitic(50), Shale(50)	No pebbles
84F-2004-SS-1005	No	No	Brown	40,60,0	Granitoid(75), Sandstone(10), Shale/Slate(10), Quartz(5)	
84F-2004-SS-1007	No	No	Dark Grey	10,65,25		Oil slicks on water, oily smell to sediment
84F-2004-SS-1008	No	No	Brown	50,50,0		Soft sediment, no gravel
84F-2004-SS-1009	No	Black	Grey Brown	45,45,10	Sedimentary - Sandstone/Shale(75), Granitoid(25)	Deep ravine
84F-2004-SS-1010	No	No	Brown	25,75,0		
84F-2004-SS-1011	No	No	Grey Brown	10,20,70		
84F-2004-SS-1012	No	Black	Grey Brown	10,30,60	Mudstone(5), Limestone(1), Chert(1), Sandstone(10), Igneous/Metamorphic(83)	Snow on ground at site, water in stream at high levels
84F-2004-SS-1013	No	No	Brown	50,50,0		
84F-2004-SS-1014	No	Black	Grey Brown	20,70,10		50% by volume moss mat in sample
84F-2004-SS-1016	No	Black	Brown-Grey	0,30,70	Black Chert(1), Carbonate(1), Sandstone(5), Mudstone(1), Igneous/Metamorphic(92)	20-25% moss mat in sample
84F-2004-SS-1017	No	No	Brown	20,70,10		

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84F-2004-SS-1018	524616	6423850	27	11	309	5.96	1.0	1.0	09/20/04	Hilly	Hummocky	Dendritic	Poor
84F-2004-SS-1019	541668	6376925	27	11	283	7.36	5.0	1.5	09/21/04	Swamp	Hummocky	Dendritic	Poor
84F-2004-SS-1020	546407	6383510	27	11	161	7.66	9.0	1.0	09/21/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-1022	546698	6383513	27	11	170	7.63	3.0	1.0	09/21/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1024	553810	6382850	27	11	130	7	5.0	1.5	09/21/04	Swamp	Level	Poor	Poor
84F-2004-SS-1025	553687	6390197	27	11	124	7.26	12.0	2.0	09/21/04	Plain	Level	Dendritic	Moderate
84F-2004-SS-1027	553946	6391624	27	11	120	7.21	7.0	2.0	09/21/04	Plain	Hummocky	Dendritic	Well
84F-2004-SS-1028	554927	6395190	27	11	224	7.36	3.0	2.0	09/21/04	Swamp	Hummocky	Poor	Poor
84F-2004-SS-1029	551346	6395677	27	11	141	7.26	30.0	5.0	09/21/04	Swamp	Level	Poor	Poor
84F-2004-SS-1030	547829	6399069	27	11	86	6.93	5.0	0.5	09/21/04	Plain	Hummocky	Dendritic	Moderate
84F-2004-SS-1031	557585	6359222	27	11	244	7.97	18.0	1.5	09/23/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1032	553060	6363897	27	11	247	7.9	12.0	2.0	09/23/04	Plain	Level	Dendritic	Well
84F-2004-SS-1033	558656	6360462	27	11	308	7.28	1.0	0.2	09/23/04	Plain	Hummocky	Dendritic	Moderate
84F-2004-SS-1034	546555	6367687	27	11	267	7.92	35.0	1.5	09/23/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1035	559353	6387177	27	11	285	7.34	1.5	1.3	09/25/04	Peneplain	Hummocky	Dendritic	Well

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84F-2004-SS-1018	Ground, Recent Snow	Primary	Permanent	Stagnant	Yellow	Transparent	Mixed	Alluvium, Colluvium	Possible - Domestic, Forestry
84F-2004-SS-1019	Ground, Recent Snow	Primary	Permanent	Stagnant	None	Transparent	Deciduous, Grass	Colluvium, Organic	None
84F-2004-SS-1020	Ground	Secondary	Permanent	Fast	Yellow	Partly Cloudy	Mixed	Alluvium, Till	None
84F-2004-SS-1022	Ground, Recent Snow	Primary	Permanent	Torrential	Yellow	Cloudy	Mixed	Alluvium, Colluvium	None
84F-2004-SS-1024	Ground	Primary	Permanent	Slow	None	Partly Cloudy	Grass	Colluvium, Organic	None
84F-2004-SS-1025	Ground, Recent Snow	Secondary	Permanent	Fast	Yellow	Transparent	Coniferous, Grass	Colluvium, Organic	None
84F-2004-SS-1027	Ground	Secondary	Permanent	Torrential	Yellow	Transparent	Mixed	Alluvium, Colluvium	None
84F-2004-SS-1028	Ground, Recent Snow	Primary	Permanent	Slow	None	Transparent	Grass		None
84F-2004-SS-1029	Ground	Primary	Permanent	Slow	None	Transparent	Bog	Alluvium, Colluvium	None
84F-2004-SS-1030	Ground	Secondary	Permanent	Fast	Yellow	Transparent	Grass	Alluvium, Colluvium	None
84F-2004-SS-1031	Ground	Secondary	Permanent	Fast	Yellow	Partly Cloudy	Mixed	Alluvium, Colluvium, Till	Possible - Forestry, Burn
84F-2004-SS-1032	Ground	Secondary	Permanent	Fast	Yellow	Cloudy	Mixed	Outwash	Possible - Forestry, Other - Hunting Trails
84F-2004-SS-1033	Ground	Primary	Permanent	Moderate	Yellow	Transparent	Coniferous, Grass	Colluvium, Organic	Possible - Cutlines
84F-2004-SS-1034	Ground	Tertiary	Permanent	Fast	Brown	Partly Cloudy	Mixed	Alluvium, Colluvium	Possible - Forestry
84F-2004-SS-1035	Ground, Recent Rain/Snow	Primary	Permanent	Moderate	Yellow	Transparent	Grass	Colluvium, Organic	Possible - Forestry

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84F-2004-SS-1018	No	No	Grey	10,30,60		Between beaver dams; 30% moss mat by volume in sample; traces of burned shale (red)
84F-2004-SS-1019	No	No	Grey	10,40,50		
84F-2004-SS-1020	No	No	Green-Grey	30,70,0	Mudstone(20), Sandstone(30), Fossiliferous Limestone(30), Granitoid(20)	Stream at high levels, fast and muddy
84F-2004-SS-1022	No	No	Grey Brown	10,80,10		Stream in flood after Sunday snowfall, Monday melt
84F-2004-SS-1024	No	No	Grey Brown	10,80,10		Beaver dam sampled
84F-2004-SS-1025	No	No	Grey Brown			
84F-2004-SS-1027	No	No	Brownish Grey	25,70,5	Sandstone(50), Granitoid(40), Mudstone(10)	Stream in flood; HMC sample taken from embayment in bank, silt sample from beaver dam
84F-2004-SS-1028	No	No	Dark Brown	0,50,50		
84F-2004-SS-1029	No	No	Greenish Brown	10,80,10		*Sampled at beaver dam, wolf tracks on dam*
84F-2004-SS-1030	No	No	Grey Green	5,80,15		Channel too deep for bulk (HMC) sample, sampled silt at beaver dam
84F-2004-SS-1031	No	No	Grey Brown	10,85,5	Granitoid(80), Sandstone(10), Mudstone(10)	Stream at high water, sampled below dam, silt sample 15% by volume moss mat
84F-2004-SS-1032	No	No	Brown	65,30,5	Mudstone(50), Shale(50)	Rossbear Creek; high level, graded outwash bedding at bank, sampled on inside bend in active channel
84F-2004-SS-1033	No	No	Grey	10,80,10		Sampled below breach in big beaver dam
84F-2004-SS-1034	No	No	Brown	80,20,0	Granitoid(80), Sandstone(10), Conglomerate(5), Fossil Limestone(5)	Buffalo River in flood
84F-2004-SS-1035	No	No	Grey Brown	10,70,20		Sampled at breach in beaver dam; silt sample 50% moss mat by volume

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84F-2004-SS-1036	537607	6395042	27	11	152	7.6	4.0	0.2	09/25/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1037	549120	6402400	27	11	79	7.31	1.5	1.0	09/25/04	Peneplain	Hummocky	Dendritic	Well
84F-2004-SS-1038	549994	6405316	27	11	86	7.21	1.0	0.8	09/25/04	Peneplain	Hummocky	Dendritic	Poor
84F-2004-SS-1039	548685	6405685	27	11	50	6.37	0.7	0.5	09/25/04	Swamp	Hummocky	Dendritic	Poor
84F-2004-SS-1040	554377	6426170	27	11	907	5.7	0.7	0.1	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1042	552168	6424794	27	11	276	7.41	6.0	0.4	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1044	551348	6423502	27	11	366	7.39	0.9	0.1	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1045	551405	6423506	27	11	315	6.71	1.5	0.3	09/26/04	Hilly	Hummocky, Inclined	Dendritic	Well
84F-2004-SS-1046	550722	6428170	27	11	628	5.47	0.5	0.1	09/26/04	Hilly	Level	Dendritic	Well
84F-2004-SS-1047	548992	6425968	27	11	750	8.04	1.0	0.2	09/26/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-1048	543035	6422907	27	11	246	7.88	5.0	0.4	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1049	543010	6422669	27	11	298	8.02	4.0	0.4	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1050	537195	6426285	27	11	471	7.23	0.9	0.1	09/26/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1052	541575	6318559	27	11	391	7.5	0.5	0.2	09/30/04	Hilly	Hummocky	Dendritic	Well

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84F-2004-SS-1036	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Brown	Partly Cloudy	Mixed	Alluvium, Colluvium	None
84F-2004-SS-1037	Ground	Primary	Permanent	Fast	Brown	Partly Cloudy	Grass	Alluvium, Colluvium	None
84F-2004-SS-1038	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Yellow	Partly Cloudy	Mixed, Grass	Colluvium, Organic	Possible - Forestry
84F-2004-SS-1039	Ground	Primary	Re-emergent	Slow	Yellow	Partly Cloudy			None
84F-2004-SS-1040	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Brown	Cloudy	Deciduous	Alluvium, Till	Possible - Hunting Camps
84F-2004-SS-1042	Ground, Recent Rain/Snow	Secondary	Permanent	Fast	Brown	Cloudy	Mixed	Alluvium, Colluvium, Outwash	Possible - Forestry, Hunting Camps
84F-2004-SS-1044	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Brown Grey	Cloudy	Mixed	Alluvium, Colluvium, Outwash(?)	None
84F-2004-SS-1045	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Grey-Brown	Cloudy	Mixed	Alluvium, Colluvium, Bare Rock, Talus/Scree	None
84F-2004-SS-1046	Ground, Recent Rain/Snow	Primary	Permanent	Moderate				Alluvium	Probable - Forestry, Hunting
84F-2004-SS-1047	Ground, Recent Rain/Snow	Primary	Permanent	Slow	Grey-Brown	Cloudy	Deciduous	Alluvium, Colluvium, Till(?)	None
84F-2004-SS-1048	Ground, Recent Rain/Snow	Secondary	Permanent	Fast	Yellow	Partly Cloudy	Mixed	Alluvium, Till(?)	Possible - Forestry, Hunting Camps
84F-2004-SS-1049	Ground, Recent Rain/Snow	Primary	Permanent	Fast	None	Transparent	Mixed	Alluvium, Colluvium, Outwash	None
84F-2004-SS-1050	Ground, Recent Rain/Snow	Primary	Permanent	Moderate	Brown	Cloudy	Mixed	Alluvium, Colluvium, Outwash	Possible - Hunting Roads
84F-2004-SS-1052	Ground, Recent Snow	Primary	Permanent	Slow	Yellow	Transparent	Coniferous	Colluvium, Organic	Possible - Forestry

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84F-2004-SS-1036	No	No	Grey-Brown	50,45,5	Sandstone(10), Mudstone(5), Limestone(5), Igneous/Metamorphic(80)	
84F-2004-SS-1037	No	No	Grey Brown	20,70,10		Silt sample 50% moss mat by volume
84F-2004-SS-1038	No	No	Brown	5,85,10	Sandstone(5), Mudstone(5), Limestone(5), Igneous/Metamorphic(85)	100% moss mat silt sample; deep, fast flowing trench, difficult site
84F-2004-SS-1039	No	No	Brownish Grey	0,50,50		Site in middle of fen, challenging access; silt sample 100% moss mat
84F-2004-SS-1040	No	No	Grey Brown	5,90,5		Small, fast-flowing, muddy stream
84F-2004-SS-1042	No	No	Greyish Brown	15,75,10	Shale(50), Mudstone(10), Igneous/Metamorphic(30), Sandstone(10)	T-12, Bank is graded glaciofluvial (pebble to silt size), bedrock (shale) exposed at base of glaciofluvial sequence; deer and wolf tracks
84F-2004-SS-1044	No	No				Probable glaciofluvial bank
84F-2004-SS-1045	No	No	Brown - Grey	5,90,5		Stream runs through poorly consolidated shale beds
84F-2004-SS-1046	No	No	Brown	40,60,0		Shale beds on bank?
84F-2004-SS-1047	No	No	Grey-Brown	15,75,10		
84F-2004-SS-1048	No	No	Grey-Brown	40,50,10	Shale(40), Mudstone(15), Limestone(15), Igneous/Metamorphic(30)	
84F-2004-SS-1049	No	Black	Grey-Brown	70,30,0		Boulders and sand - no pebble size fraction
84F-2004-SS-1050			Grey Brown	10,85,5		Stream runs through old beaver meadow
84F-2004-SS-1052	No	No	Dark Grey Brown	50,40,10	Carbonate, Mudstone, Sandstone, Igneous/Metamorphic	Near old (logging?) road

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84F-2004-SS-1053	542108	6327919	27	11	296	7.77	6.5	1.0	09/30/04	Hilly	Hummocky	Dendritic	Well
84F-2004-SS-1054	549572	6321493	27	11	266	7.83	3.0	0.8	09/30/04	Hilly	Hummocky	Dendritic	Moderate
84F-2004-SS-2002	530677	6407245	27	11	135	7.63	10.0	0.3	09/16/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2003	530526	6407483	27	11	110	6.8	2.0	0.3	09/16/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2004	537217	6404021	27	11	193	7.66	8.0	0.4	09/16/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2005	526909	6401917	27	11	220	7.8	6.0	0.4	09/17/04	Hilly	Inclined	Herringbone	Well
84F-2004-SS-2007	520310	6403632	27	11	184	7.74	9.0	0.5	09/17/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2008	514050	6405931	27	11	186	7.77	2.0	0.3	09/17/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2009	514073	6406033	27	11	776	7.14	1.0	0.2	09/17/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2010	522976	6412604	27	11	192	6.94	1.2	0.2	09/17/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2011	521690	6416567	27	11	536	7.7	0.7	0.2	09/17/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2013	541654	6406941	27	11	178	7.53	1.5	0.3	09/20/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2014	541382	6405376	27	11	183	7.28	1.2	0.3	09/20/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2015	540325	6406933	27	11	99	7.29	2.5	0.3	09/20/04	Plain	Inclined	Dendritic	Moderate

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84F-2004-SS-1053	Ground	Secondary	Permanent	Fast	None	Transparent	Coniferous, Grass	Alluvium, Till	Possible - Hunting camps
84F-2004-SS-1054	Ground	Primary	Permanent	Moderate	Yellow	Partly Cloudy	Coniferous, Grass	Alluvium, Till	Possible - Forestry
84F-2004-SS-2002	Ground	Secondary	Permanent	Moderate	Red-Brown	Transparent	Mixed	Bare Rock	None
84F-2004-SS-2003	Ground	Secondary	Permanent	Fast	Brown	Cloudy	Deciduous	Colluvium	None
84F-2004-SS-2004	Ground	Secondary	Permanent	Fast	Yellow-Brown	Transparent	Mixed	Outwash?	None
84F-2004-SS-2005	Ground	Secondary	Permanent	Moderate	Brown	Transparent	Mixed	Outwash	None
84F-2004-SS-2007	Ground	Secondary	Permanent	Moderate	Brown	Transparent	Mixed		None
84F-2004-SS-2008	Ground	Secondary	Permanent	Fast	Red-Brown	Transparent	Mixed		None
84F-2004-SS-2009	Ground	Secondary	Intermittent	Stagnant	Yellow-Brown	Partly Cloudy	Mixed	Outwash	None
84F-2004-SS-2010	Ground	Primary	Permanent	Moderate	Brown	Transparent	Deciduous	Till	None
84F-2004-SS-2011	Ground	Primary	Intermittent	Slow	Brown	Cloudy	Deciduous	Colluvium	None
84F-2004-SS-2013	Ground, Recent Rain	Secondary	Permanent	Moderate	Brown	Partly Cloudy	Coniferous	Colluvium	None
84F-2004-SS-2014	Ground, Recent Rain	Primary	Permanent	Slow	Light Brown	Partly Cloudy	Coniferous	Colluvium	None
84F-2004-SS-2015	Ground, Recent Rain	Primary	Permanent	Moderate	Light Brown	Partly Cloudy	Mixed	Colluvium	None

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84F-2004-SS-1053	No	No	Brown	70,30,0	Mudstone(1), Limestone(2), Sandstone(3), Igneous/Metamorphic(95)	Bar U-shaped, pointing downstream
84F-2004-SS-1054	No	Red	Grey Brown	40,50,10	Mudstone(1), Sandstone(2), Black Chert(1), Igneous/Metamorphic(96)	Below beaver dam
84F-2004-SS-2002	No	No	Brown	60,40,0	Granitoid(50), Sandstone(24), Mudstone(24), Chert(1), Quartz(1)	~800m upstream of target
84F-2004-SS-2003	No	No	Brown	80,20,0		V-shaped valley upstream from beaver meadow
84F-2004-SS-2004	No	No	Tan Brown	60,40,0	Granitoids(60), Metamorphics(20), Sandstone(10), Others(10)	Glaciofluvial sand above gravel in bank - last site of day
84F-2004-SS-2005	No	No	Brown	70,30,0	Granitoid(50), Sandstone(40), Limestone(8), Chert(1), Mudstone(1)	
84F-2004-SS-2007	No	No	Grey Brown	80,20,0	Granitoid(60), Sandstone(30) Quartzite(5), Others(5)	Below confluence
84F-2004-SS-2008	No	No	Brown	80,20,0	Granitoid(60), Sandstone(20), Limestone(15), Siltstone/Mudstone(5)	
84F-2004-SS-2009	No	No	Grey	70,20,10		Tributary of 84F-2004-SS-2008 stream, site immediately below beaver dam, orange organic material on rocks in stream bed
84F-2004-SS-2010	No	No	Grey-Black	85,15,0	Shale/Mudstone(98), Igneous/Granitoid(2)	Dominant grey-black shale-mudstone pebbles/sand in stream; granitoids noticeably absent; shale outcrop ~150 m downstream of site (on SW bank)
84F-2004-SS-2011	No	Mild Fe, Mn	Grey	90,10,0	Shale(90), Granitoid(5), Sandstone(5)	Shale chip-rich sediment, site between beaver ponds
84F-2004-SS-2013	No	No	Grey Brown	45,45,10		5 cm of snow on the ground following two days of rain; tributary of larger stream, abandoned HMC sample, bouldery stream bed atop mud
84F-2004-SS-2014	No	No	Brown	55,40,5	Granitoid(50), Sandstone(30), Limestone(10), Others(10)	Gravel veneer on top of grey clay-rich till, site immediately below confluence of two small streams
84F-2004-SS-2015	No	No	Grey Brown	30,65,5		Sampled "wash-out" beside beaver dam

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84F-2004-SS-2016	534976	6412423	27	11	250	7.75	6.0	0.4	09/20/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2017	533812	6414296	27	11	81	7.23	1.2	0.3	09/20/04	Plain	Level	Dendritic	Moderate
84F-2004-SS-2018	534682	6415773	27	11	157	7.64	1.3	0.2	09/20/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2019	533216	6417072	27	11	130	7.61	2.2	0.3	09/20/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2020	541046	6381818	27	11	183	7.66	10.0	0.3	09/21/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2022	544099	6382974	27	11	204	7.95	1.5	0.2	09/21/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2023	541073	6388938	27	11	90	7.41	2.0	0.3	09/21/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2024	538186	6390265	27	11	356	8.14	1.0	0.1	09/21/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2025	552254	6368396	27	11	151	7.74	1.5	0.3	09/23/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2026	548754	6369881	27	11	198	7.89	1.3	0.2	09/23/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2027	559025	6416048	27	11	52	7.06	4.0	0.4	09/24/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2028	545317	6415691	27	11	26	6.72	8.0	0.4	09/24/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2029	557958	6398209	27	11	233	7.87	9.0	0.4	09/25/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2030	555853	6401277	27	11	156	7.61	0.7	0.2	09/25/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2031	556488	6402653	27	11	205	7.77	1.0	0.8	09/25/04	Hilly	Hummocky	Dendritic	Moderate
84F-2004-SS-2032	555583	6408906	27	11	133	7.62	4.0	0.7	09/25/04	Plain	Hummocky	Dendritic	Moderate

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84F-2004-SS-2016	Ground, Recent Rain	Primary	Permanent	Moderate	Red Brown (bog coloured)	Transparent	Coniferous	Colluvium	None
84F-2004-SS-2017	Ground, Recent Rain	Primary	Permanent	Slow	Light Yellow-Brown	Transparent	Coniferous	Colluvium	None
84F-2004-SS-2018	Ground, Recent Rain	Primary	Permanent	Slow	Light Yellow-Brown	Transparent	Coniferous	Colluvium	None
84F-2004-SS-2019	Ground, Recent Rain	Primary	Permanent	Moderate	Light Brown	Transparent	Coniferous	C	Possible - Forestry
84F-2004-SS-2020	Ground, Recent Rain	Secondary	Permanent	Moderate	Brown	Cloudy	Mixed	Outwash	None
84F-2004-SS-2022	Ground, Recent Rain	Secondary	Permanent	Fast	Brown	Cloudy	Deciduous	Alluvium	None
84F-2004-SS-2023	Ground, Recent Rain	Primary	Permanent	Moderate	Red-Brown	Transparent	Mixed	Till	None
84F-2004-SS-2024	Ground, Recent Rain	Primary	Permanent	Moderate	Brown	Partly Cloudy	Deciduous		None
84F-2004-SS-2025	Ground, Recent Rain	Secondary	Permanent	Moderate	Yellow	Partly Cloudy	Mixed	Till	None
84F-2004-SS-2026	Ground, Recent Rain	Primary	Permanent	Moderate	Slightly Yellow	Transparent	Mixed	Colluvium	None
84F-2004-SS-2027	Ground, Recent Rain	Secondary	Permanent	Moderate	Red-Brown	Transparent	Coniferous	N/A	None
84F-2004-SS-2028	Ground, Recent Rain	Secondary	Permanent	Moderate	Red-Brown	Transparent	Coniferous	N/A	None
84F-2004-SS-2029	Ground, Recent Rain	Secondary	Permanent	Moderate	Brown	Partly Cloudy	Mixed	Till	None
84F-2004-SS-2030	Ground, Recent Rain	Secondary	Permanent	Moderate	None	Transparent	Coniferous	Till, Other - aeolian	None
84F-2004-SS-2031	Ground, Recent Rain	Secondary	Permanent	Moderate	Red Brown	Transparent	Coniferous, Grass	Colluvium	None
84F-2004-SS-2032	Ground, Recent Rain	Secondary	Permanent	Moderate	Light Red Brown	Transparent	Coniferous, Grass	Colluvium	None

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84F-2004-SS-2016	No	No	Grey Brown	50,45,5	Granitoids(60), Limestone(30), Sandstone(5), Others(5)	Bouldery site
84F-2004-SS-2017	No	No	Grey Brown	10,85,5		Small stream, very little variety in size and composition
84F-2004-SS-2018	No	No	Brown	25,75,0		Logged area ~100 m NE of site
84F-2004-SS-2019	No	No	Grey Brown	60,35,5	Granitoid(60), Sandstone(20), Limestone(10), Others(10)	Clear cut (~10 years old) ~25 m north of site, some cobbles and boulders, mostly silt and clay in rest of stream.
84F-2004-SS-2020	No	No	Grey Brown	75,25,0	Granitoids(50), Sandstone(20), Limestone(25), Others(5)	
84F-2004-SS-2022	No	No	Brown-Grey	25,45,50		Tributary - many slabs of Dunvegan sandstone in streambed
84F-2004-SS-2023	No	No	Green-Gray	25,70,5	Igneous/Metamorphic(80), Sandstone(10), Limestone(5), Shale/Mudstone(5)	
84F-2004-SS-2024	No	No	Green-Gray	10,85,5	Igneous/Metamorphic(80), Sandstone(10), Limestone(5), Shale/Mudstone(5)	Upstream from old beaver pond/meadow
84F-2004-SS-2025	No	No	Grey Brown	40,60,0	Granitoids(50), Sandstone(30), Limestone(10), Others(10)	Site from old beaver dam
84F-2004-SS-2026	No	No	Brown	45,45,10	Granitoid(45), Sandstone(40), Black Chert(10), Others(5)	Old beaver dams up and downstream, site at only spot with cobbles in stream bed
84F-2004-SS-2027	No	No	Grey-Brown	20,75,5		Below small beaver dam
84F-2004-SS-2028	No	Black (Mn)	Grey-Brown	40,60,0	Igneous/Metamorphic(85), Sandstone(10), Mudstone(5)	Jackpine forest, downstream of large beaver meadow, two semi-massive pyrite cobbles noted
84F-2004-SS-2029	No	No	Green Brown	35,65,0	Granitoids(75), Sandstone(15), Others(10)	Cabin ~150 m SW of site
84F-2004-SS-2030	No	Black	Brown	50,50,0	Granitoid(50), Sandstone(20), Quartzite(10), Others(10)	Jackpine forest, upstream of last site on tributary, gravel veneer (mostly sand) atop clay-rich till
84F-2004-SS-2031	No	No	Brown	40,50,10		
84F-2004-SS-2032	No	No	Greenish Grey	40,50,10	Granitoids(55), Sandstone(20), Limestone(20), Others(5)	Fossiliferous limestone cobbles and pebbles

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84F-2004-SS-2033	558600	6425642	27	11	413	7.52	2.5	0.3	09/26/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2034	557368	6423035	27	11	304	7.59	1.5	0.2	09/26/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2035	550855	6421924	27	11	162	7.72	1.7	0.2	09/26/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2036	549560	6420524	27	11	151	7.73	2.2	0.2	09/26/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2037	539035	6425338	27	11	313	6.81	2.0	0.1	09/26/04	Hilly	Inclined	Dendritic	Moderate
84F-2004-SS-2038	540019	6418926	27	11	331	7.8	0.9	0.3	09/27/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2040	534330	6426467	27	11	628	7.31	0.7	0.2	09/27/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2042	529569	6425001	27	11	285	7.74	1.1	0.2	09/27/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2044	521927	6421830	27	11	378	7.57	0.9	0.1	09/27/04	Plain	Inclined	Dendritic	Moderate
84F-2004-SS-2045	540071	6427744	27	11	463	6.99	1.8	0.1	09/28/04	Hilly	Inclined	Dendritic	Well
84F-2004-SS-2046	542115	6426147	27	11	1721	3.26	0.3	0.1	09/28/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-1002	575449	6420791	27	11	542	7.02	0.5	0.1	09/22/04	Hilly	Hummocky/ Inclined	Dendritic	Well
84G-2004-SS-1003	569016	6417516	27	11	200	7.89	12.0	1.0	09/22/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-1005	571645	6418502	27	11	275	7.51	18.0	2.0	09/22/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-1006	572076	6419781	27	11	752	4.02	9.0	0.2	09/22/04	Hilly	Hummocky/ Inclined	Dendritic	Moderate

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84F-2004-SS-2033	Ground, Recent Rain	Primary	Permanent	Moderate	Brown	Cloudy	Deciduous		None
84F-2004-SS-2034	Ground, Recent Rain	Primary	Permanent	Torrential	Brown	Cloudy	Deciduous	Talus/Scree	
84F-2004-SS-2035	Ground	Secondary	Permanent	Fast	Reddish Brown	Partly Cloudy	Deciduous	Alluvium	None
84F-2004-SS-2036	Ground, Recent Rain	Primary	Permanent	Fast	Reddish Brown	Transparent	Mixed	Alluvium	None
84F-2004-SS-2037	Ground, Recent Rain	Secondary	Permanent	Moderate	Brown	Cloudy	Mixed	Talus/Scree	None
84F-2004-SS-2038	Ground, Recent Rain	Primary	Permanent	Slow	Light Yellow Brown	Transparent	Mixed	Organic	None
84F-2004-SS-2040	Ground, Recent Rain	Primary	Permanent	Moderate	Grey-Brown	Cloudy	Deciduous	Colluvium	None
84F-2004-SS-2042	Ground, Recent Rain	Primary	Permanent	Moderate	Brown	Cloudy	Mixed	Till, Bare Rock	None
84F-2004-SS-2044	Ground, Recent Rain	Primary	Permanent	Moderate	Brown	Partly Cloudy	Deciduous		None
84F-2004-SS-2045	Ground, Recent Rain	Primary	Permanent	Moderate	Grey Brown	Cloudy	Deciduous	Colluvium	
84F-2004-SS-2046	Ground, Recent Rain	Primary	Permanent	Moderate	Slightly Yellow	Transparent	Deciduous	Alluvium	None
84G-2004-SS-1002	Ground	Primary	Intermittent	Slow	Yellow	Transparent	Mixed	Colluvium	None
84G-2004-SS-1003	Ground	Secondary	Permanent	Torrential		Cloudy	Mixed	Alluvium	None
84G-2004-SS-1005	Ground	Secondary	Permanent	Torrential	Brown	Cloudy	Deciduous	Alluvium, Bare Rock, Talus/Scree	None
84G-2004-SS-1006	Ground, Recent Rain/Snow	Primary	Permanent	Fast	Grey-Brown	Cloudy	Mixed	Alluvium, Till, Talus/Scree	None

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84F-2004-SS-2033	No	No	Grey Brown	25,75,0	Shale/Mudstone(80), Granitoids(15), Others(5)	10 m deep ravine, mostly shale/mudstone pebbles in stream, some terra cotta coloured shale, some yellowish shale
84F-2004-SS-2034	Yellow	No	Dark Grey-Brown	10,90,0		Shale on west bank of stream, sulphur yellow staining and oily film on shale, sandstone blocks (~2-3 m across) in stream bed
84F-2004-SS-2035	No	Black	Grey-Brown	60,40,0		Tributary on SE side of larger stream
84F-2004-SS-2036	No	moderate Black	Grey Brown	30,70,0	Granitoids(75), Sandstone(15), Limestone(5), Others(5)	Site = long bar atop grey clay-rich till, veneer ~0.3 m thick (minimum)
84F-2004-SS-2037	Yellow	No	Brown	10,90,0	Shale/Mudstone(98), Siltstone(1), Others(1)	Shale bank with sulphur precipitate, "red brick" burnt shale upslope
84F-2004-SS-2038	No	No	Dark Brown			ATV trail / cutline ~10 m downstream of site
84F-2004-SS-2040	No	No	Brown	15,85,0	Shale/Mudstone(99.99), Granitoid(0.01)	North side of BHH, seds all shale/mudstone, only 1 granitoid clast
84F-2004-SS-2042	No	Black	Brown	20,80,0	Shale/Mudstone(>99), Granitoid(<1)	Till banks upstream, shale downstream, 3 granitoid clasts/pebbles, large block of sandstone containing brachiopods
84F-2004-SS-2044	No	Black	Grey Brown	40,60,0	Shale/Mudstone(>99), Granitoid(<1)	Site upstream ~15 m from ATV trail, only 2 granitoid pebbles while sieving
84F-2004-SS-2045	No	No	Dark Grey Brown	20,80,0		Instream pH = 7.16, cond(µS) = 474 @ 7.0˚C, Tributary of Bear Creek, resample of 84F-2003-2005, grey and red shale clasts present
84F-2004-SS-2046	No	Red-Brown	Black	60,40,0		Instream pH = 3.24, cond(µS) = 1802 @ 5.9˚C, black shale chips in stream, resample of site 84F-2003-2004
84G-2004-SS-1002	No	No	Grey Brown	10,65,25		Small stream flowing off north face of Buffalo Head Hills
84G-2004-SS-1003	No	No				Stream in flood, water muddy, huge sandstone boulders/concretions(?) in channel
84G-2004-SS-1005	Yellow	Red	Brownish Grey	25,75,0	Shale(85), Igneous/Metamorphic(5), Sandstone(10)	Torrential flow between poorly consolidated shale and sandstone (bedrock)
84G-2004-SS-1006	No	Red	Grey	20,75,5		Stream runs through poorly consolidated shale, water very muddy

Sample Number	East (UTM)	North (UTM)	Datum	Zone	Conductivity (uS)	pH	Stream Width (m)	Stream Depth (m)	Sample Date	General Physiography	Surface Expression	Drainage Pattern	Site Drainage
84G-2004-SS-1007	572618	6424375	27	11	538	6.42	0.7	1.0	09/24/04	Swamp	Hummocky	Dendritic	Poor
84G-2004-SS-1008	568741	6422447	27	11	1321	8.02	1.0	0.2	09/24/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-1009	561046	6424770	27	11	616	7.39	0.5	0.2	09/24/04	Hilly	Hummocky	Dendritic	Moderate
84G-2004-SS-1010	560091	6423770	27	11	212	7.52	9.0	0.5	09/24/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-2002	578202	6424636	27	11	414	7.44	10.0	0.4	09/22/04	Plain	Inclined	Dendritic	Moderate
84G-2004-SS-2003	577936	6421619	27	11	642	4.88	0.4	0.4	09/22/04	Plain	Inclined	Dendritic	Moderate
84G-2004-SS-2004	579803	6419830	27	11	958	5.51	0.4	0.3	09/22/04	Hilly	Inclined	Dendritic	Moderate
84G-2004-SS-2005	583065	6418957	27	11	572	7.6	0.8	0.2	09/22/04	Plain	Inclined	Dendritic	Moderate
84G-2004-SS-2007	590404	6414509	27	11	474	7.71	5.0	0.3	09/22/04	Plain	Inclined	Dendritic	Moderate
84G-2004-SS-2008	563110	6356682	27	11	199	7.84	8.0	0.3	09/23/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-2009	561940	6357879	27	11	264	7.79	1.5	0.6	09/23/04	Plain	Hummocky	Dendritic	Moderate
84G-2004-SS-2010	560211	6366285	27	11	516	8.03	2.5	0.3	09/23/04	Hilly	Inclined	Dendritic	Moderate
84G-2004-SS-2012	585807	6414362	27	11	279	8.13	2.0	0.3	09/23/04	Hilly	Inclined	Dendritic	Moderate
84G-2004-SS-2013	574482	6421783	27	11	298	7.66	7.0	0.3	09/24/04	Plain	Inclined	Dendritic	Moderate
84G-2004-SS-2014	565782	6424429	27	11	822	7.84	1.5	0.2	09/24/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-2015	564069	6422651	27	11	1160	8.22	1.2	0.2	09/24/04	Hilly	Inclined	Dendritic	Well
84G-2004-SS-2016	559808	6417069	27	11	68	7.46	8.0	0.4	09/24/04	Hilly	Inclined	Dendritic	Well

Sample Number	Stream Source	Stream Class	Stream Type	Stream Flow	Water Colour	Water Clarity	Vegetation	Bank Types	Contamination
84G-2004-SS-1007	Ground	Primary	Permanent	Stagnant	Yellow	Transparent	Deciduous, Grass	Colluvium, Organic	Possible - Hunting Trails
84G-2004-SS-1008	Ground	Primary	Permanent	Fast	Grey	Cloudy	Mixed	Alluvium, Colluvium	None
84G-2004-SS-1009	Ground	Primary	Permanent	Slow	Yellow	Transparent	Deciduous, Grass	Colluvium, Organic	None
84G-2004-SS-1010	Ground	Secondary	Permanent	Fast	Brown	Cloudy	Deciduous	Alluvium, Colluvium, Outwash	Possible - Forestry
84G-2004-SS-2002	Ground, Recent Rain	Secondary	Permanent	Moderate	Tan Brown	Cloudy	Deciduous	Till, Outwash	Possible - Forestry
84G-2004-SS-2003	Ground, Recent Rain	Primary	Intermittent	Slow	None	Transparent	Deciduous	Colluvium	Probable - Forestry
84G-2004-SS-2004	Ground, Recent Rain	Primary	Intermittent	Slow	Yellow Gray	Partly Cloudy	Deciduous	Colluvium	Possible - Forestry
84G-2004-SS-2005	Ground, Recent Rain	Primary	Intermittent	Moderate	Grey Brown	Cloudy	Deciduous	Colluvium	None
84G-2004-SS-2007	Ground, Recent Rain	Secondary	Permanent	Fast	Brown	Cloudy	Mixed	Outwash	None
84G-2004-SS-2008	Ground, Recent Rain	Secondary	Permanent	Moderate	None	Partly Cloudy	Coniferous	Outwash	Possible - Burn
84G-2004-SS-2009	Ground, Recent Rain	Primary	Permanent	Moderate	Brown	Partly Cloudy	Grass	Colluvium	Definite - Burn
84G-2004-SS-2010	Ground, Recent Rain	Primary	Permanent	Moderate	None	Transparent	Mixed	Alluvium	None
84G-2004-SS-2012	Ground, Recent Rain	Primary	Permanent	Fast	Yellow-Brown	Cloudy	Mixed	Alluvium	None
84G-2004-SS-2013	Ground, Recent Rain	Secondary	Permanent	Moderate	Grey	Cloudy	Deciduous	Outwash	None
84G-2004-SS-2014	Ground, Recent Rain	Primary	Permanent	Fast	Grey-Brown	Cloudy	Mixed	Colluvium	None
84G-2004-SS-2015	Ground, Recent Rain	Primary	Permanent	Fast	Grey-Brown	Partly Cloudy	Deciduous	Other	Possible - Forestry
84G-2004-SS-2016	Ground, Recent Rain	Secondary	Permanent	Fast	Red-Brown	Transparent	Mixed	Alluvium	None

Sample Number	Bank Precipitate	Bottom Precipitate	Sample Colour	Sample Composition (%) Sand, Silt+Clay, Organic	Clast Lithologies At Site (%)	Comment
84G-2004-SS-1007	No	No	Grey Brown	15,70,15		
84G-2004-SS-1008	No	Black	Grey	45,50,5	Sandstone(90), Shale(10)	
84G-2004-SS-1009	No	No	Brown	25,65,10		
84G-2004-SS-1010	No	No	Grey Brown		Shale, Granitoid, Sandstone(15), Mudstone(10)	Stream high, fast and turbulent; bank cuts into graded outwash/ glaciofluvial deposit; shale clasts are pebble-size or smaller
84G-2004-SS-2002	No	No	Brown	35,60,5	Shale(50), Granitoids(30), Sandstone(10), Others(10)	Cleared/logged area ~50 m south of site
84G-2004-SS-2003	No	No	Brown	5,75,20		
84G-2004-SS-2004	No	No	Grey	15,65,20		
84G-2004-SS-2005	No	No	Grey Brown	15,85,0		Clay plain with alders
84G-2004-SS-2007	No	No	Grey-Brown	20,80,0	Granitoid(40), Sandstone(30), Limestone(20), Others(10)	Tributary of Rat Creek
84G-2004-SS-2008	No	No	Grey-Brown	20,80,0	Granitoids(50), Sandstone(30), Limestone(10), Others(10)	Rossbear Creek, area around site burned ~2 years ago
84G-2004-SS-2009	No	No	Grey Brown	45,45,10		High water
84G-2004-SS-2010	No	No	Brown	30,50,20	Granitoids(50), Sandstone(30), Limestone(10), Others(10)	Old beaver pond (dried up), sand rich HMC site
84G-2004-SS-2012	No	No	Brown	70,30,0	Granite(60), Sandstone(20), Mudstone/Shale(10), Others(10)	Rat Creek, upstream of bridge
84G-2004-SS-2013	No	Black	Grey-Brown	50,45,5	Granitoids(50), Sandstone(20), Mudstone/Shale(25), Others(5)	Sampled below beaver dam, very muddy
84G-2004-SS-2014	No	No	Grey-Brown	40,60,0		Site in ravine ~50 m east of area logged ~10 to 15 years ago
84G-2004-SS-2015	No	Black (Mn)	Grey-Brown	25,75,0	Sandstone(50), Mudstone(20), Igneous/Metamorphic(30)	Bank is silty-clay with no pebbles or sand, possible glaciolacustrine
84G-2004-SS-2016	No	Black (Mn)	Grey-Brown	40,60,0	Igneous/Metamorphic(55), Sandstone(20), Mudstone(10), Limestone(15)	Lots of boulders

Appendix 4 – Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Analytical Data from the 2004 Stream Sediment Samples (<80 Mesh Fractions)

Sample Number	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Mo (ppm)	Ag (ppb)	Ba (ppm)	Hg (ppb)	Pb (ppm)
84B 2004 SS 1002	11.8	9.08	49.9	19.6	0.62	77	332.8	44	7.66
84B 2004 SS 1004	12.3	9.17	50.4	25.6	0.76	70	566.1	39	6.61
84B 2004 SS 1005	25.8	23.04	78.3	9.6	1.61	115	232.5	35	12.22
84B 2004 SS 2002	12.1	7.41	50.1	19.0	0.50	58	409.5	29	5.54
84B 2004 SS 2003	17.6	13.38	62.0	14.5	2.67	88	290.3	44	8.10
84C 2004 SS 1002	29.6	24.52	84.7	17.6	1.02	102	190.9	63	12.88
84C 2004 SS 1004	11.6	8.56	53.6	4.9	0.69	61	149.7	25	7.28
84C 2004 SS 2002	14.8	12.61	53.4	5.5	0.39	81	208.7	28	7.70
84C 2004 SS 2003	8.3	5.41	32.1	2.5	0.27	39	156.4	24	4.25
84C 2004 SS 2004	12.8	11.94	55.2	3.2	0.42	82	182.3	32	6.68
84C 2004 SS 2005	11.5	10.92	55.3	2.3	0.29	75	166.8	34	6.19
84C 2004 SS 2006	12.1	10.06	56.8	7.0	0.40	83	233.1	39	6.42
84C 2004 SS 2007	16.4	13.71	66.8	7.8	0.63	91	222.8	40	8.47
84C 2004 SS 2008	13.4	11.28	60.6	6.2	0.46	90	188.1	29	7.41
84C 2004 SS 2009	12.7	11.88	56.2	4.3	0.54	94	158.3	43	6.98
84C 2004 SS 2010	13.2	11.23	61.8	3.9	0.28	79	210.4	43	7.46
84C 2004 SS 2011	20.2	18.68	75.6	5.5	0.51	100	208.3	45	10.32
84F 2004 SS 1002	26.9	18.77	95.9	13.0	2.34	134	338.3	69	10.80
84F 2004 SS 1003	20.8	15.32	73.3	7.6	1.35	113	289.4	49	8.72
84F 2004 SS 1004	20.9	17.68	90.4	4.1	0.72	126	250.5	66	9.92
84F 2004 SS 1005	22.8	14.93	88.8	9.4	1.37	134	334.8	70	9.50
84F 2004 SS 1007	27.7	16.98	111.6	9.1	0.76	148	322.9	46	11.57
84F 2004 SS 1008	17.5	13.61	70.6	6.1	0.69	81	214.5	62	9.10
84F 2004 SS 1009	18.9	13.14	69.6	6.0	0.72	108	298.3	70	9.03
84F 2004 SS 1010	12.8	5.68	47.0	2.9	0.22	53	163.3	41	4.46
84F 2004 SS 1011	23.2	15.21	97.3	11.2	3.80	113	397.0	51	9.38
84F 2004 SS 1012	23.4	14.72	109.6	17.7	2.80	123	364.5	60	9.62
84F 2004 SS 1013	19.3	11.25	61.1	7.4	1.07	65	317.8	41	8.30
84F 2004 SS 1014	25.0	14.48	85.0	8.8	1.56	127	384.3	69	9.57
84F 2004 SS 1016	18.9	9.63	72.8	5.1	0.43	93	245.7	68	7.73
84F 2004 SS 1017	18.0	9.00	63.9	5.0	0.45	87	238.0	61	7.19
84F 2004 SS 1018	22.4	20.60	85.5	13.4	2.23	130	373.1	67	12.03

Sample Number	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Mo (ppm)	Ag (ppb)	Ba (ppm)	Hg (ppb)	Pb (ppm)
84F 2004 SS 1019	26.6	22.97	100.0	6.6	1.10	159	194.7	71	11.34
84F 2004 SS 1020	21.4	19.37	87.2	8.9	1.29	140	250.9	60	10.71
84F 2004 SS 1022	21.1	18.59	79.5	7.8	1.19	139	255.5	62	10.80
84F 2004 SS 1024	15.8	16.32	85.5	4.3	0.46	104	145.9	48	11.19
84F 2004 SS 1025	8.6	7.25	56.9	1.6	0.24	59	99.6	30	5.21
84F 2004 SS 1027	12.9	11.42	59.7	2.0	0.35	81	144.4	41	7.71
84F 2004 SS 1028	9.5	11.18	40.8	2.3	0.63	63	158.6	67	4.18
84F 2004 SS 1029	14.7	13.54	67.9	3.0	0.38	99	178.6	52	8.77
84F 2004 SS 1030	11.5	9.23	62.2	2.2	0.38	72	133.3	46	7.06
84F 2004 SS 1031	15.0	12.60	67.1	5.7	0.71	97	238.4	42	8.38
84F 2004 SS 1032	12.0	9.31	48.2	4.5	0.53	71	203.6	28	6.23
84F 2004 SS 1033	29.8	28.34	98.3	10.0	1.45	121	247.7	60	14.06
84F 2004 SS 1034	19.0	15.20	74.7	7.5	0.90	118	273.8	51	9.50
84F 2004 SS 1035	13.9	12.55	57.4	3.9	0.38	83	150.2	40	7.84
84F 2004 SS 1036	20.4	12.23	74.1	8.7	1.67	88	255.7	54	7.94
84F 2004 SS 1037	10.4	6.75	51.5	3.5	0.43	58	129.2	34	6.04
84F 2004 SS 1038	12.3	6.46	60.4	8.3	0.54	56	184.5	54	7.70
84F 2004 SS 1039	9.1	5.75	43.5	25.2	1.93	66	324.0	84	10.17
84F 2004 SS 1040	22.5	19.65	95.6	9.8	1.30	125	288.2	94	10.12
84F 2004 SS 1042	23.1	17.32	89.1	9.2	1.17	110	310.7	88	9.88
84F 2004 SS 1044	31.0	21.60	104.0	9.2	1.45	127	334.8	91	11.55
84F 2004 SS 1045	26.0	22.93	105.5	11.6	1.48	133	305.7	100	11.66
84F 2004 SS 1046	25.9	27.89	107.6	13.8	2.19	164	301.3	97	12.73
84F 2004 SS 1047	30.5	25.10	110.7	8.9	0.90	161	376.4	109	12.24
84F 2004 SS 1048	23.9	14.60	82.4	8.1	1.67	106	342.8	64	8.91
84F 2004 SS 1049	23.6	13.84	78.7	7.0	0.99	99	347.4	68	8.36
84F 2004 SS 1050	27.8	27.71	103.2	10.4	1.47	149	320.0	94	12.85
84F 2004 SS 1052	19.2	16.40	103.0	5.3	0.88	130	265.5	55	10.24
84F 2004 SS 1053	19.8	17.02	76.8	14.8	1.37	114	229.8	44	10.51
84F 2004 SS 1054	27.2	25.41	93.4	9.8	1.24	152	283.6	61	12.86
84F 2004 SS 2002	17.9	10.48	69.0	7.0	1.12	88	296.2	45	7.09
84F 2004 SS 2003	22.9	15.14	91.2	10.5	1.44	101	297.9	53	11.06

Sample Number	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Mo (ppm)	Ag (ppb)	Ba (ppm)	Hg (ppb)	Pb (ppm)
84F 2004 SS 2004	30.7	19.76	96.0	19.8	4.01	141	341.0	75	14.06
84F 2004 SS 2005	20.2	13.97	70.6	10.0	1.51	107	351.5	55	8.94
84F 2004 SS 2007	16.3	10.01	58.1	7.2	1.19	77	342.4	37	7.20
84F 2004 SS 2008	16.8	10.22	61.2	7.3	1.06	92	276.2	46	7.09
84F 2004 SS 2009	19.0	15.47	70.0	7.8	0.88	120	303.3	48	9.34
84F 2004 SS 2010	25.8	21.48	111.8	12.2	3.37	135	415.8	52	14.00
84F 2004 SS 2011	33.9	20.59	99.9	12.1	2.07	129	490.7	71	13.15
84F 2004 SS 2013	43.7	23.72	116.8	17.3	4.31	152	394.5	87	16.23
84F 2004 SS 2014	23.0	16.04	75.7	13.4	3.03	111	282.0	53	10.24
84F 2004 SS 2015	23.9	10.15	64.5	6.4	1.37	96	217.1	66	8.39
84F 2004 SS 2016	19.1	11.73	78.1	13.9	1.20	105	259.5	66	8.87
84F 2004 SS 2017	21.1	11.60	80.9	6.9	0.89	108	280.3	55	10.35
84F 2004 SS 2018	22.5	11.44	84.1	8.6	0.65	110	247.8	73	8.67
84F 2004 SS 2019	19.2	11.68	79.2	6.7	0.74	103	255.7	67	8.98
84F 2004 SS 2020	21.7	14.84	77.4	7.7	1.11	111	241.5	52	10.52
84F 2004 SS 2022	35.1	28.08	124.1	14.5	1.28	167	345.5	121	19.26
84F 2004 SS 2023	19.0	14.03	77.0	7.3	1.02	105	194.1	51	9.91
84F 2004 SS 2024	28.0	22.94	101.4	8.8	1.12	179	318.6	80	14.12
84F 2004 SS 2025	24.4	19.48	87.3	8.1	1.03	129	282.0	56	11.89
84F 2004 SS 2026	16.9	10.05	61.0	5.9	0.77	75	229.9	43	7.82
84F 2004 SS 2027	26.5	19.70	103.1	8.9	2.37	146	279.0	73	13.10
84F 2004 SS 2028	24.8	20.03	105.7	13.0	1.87	172	297.4	99	13.22
84F 2004 SS 2029	25.7	17.44	90.1	11.9	1.50	116	277.6	56	11.38
84F 2004 SS 2030	22.9	14.85	90.0	11.7	1.59	115	221.4	60	10.91
84F 2004 SS 2031	18.8	11.91	78.8	10.1	0.86	99	224.7	55	9.65
84F 2004 SS 2032	17.6	12.35	72.8	8.4	0.93	77	188.8	41	9.53
84F 2004 SS 2033	24.6	17.63	86.8	8.8	1.11	119	323.3	91	10.51
84F 2004 SS 2034	26.4	24.02	98.3	9.7	1.10	150	329.1	102	12.72
84F 2004 SS 2035	25.5	13.81	75.5	8.8	2.06	106	384.8	66	9.19
84F 2004 SS 2036	18.7	12.31	72.1	5.8	0.62	97	193.7	62	8.66
84F 2004 SS 2037	22.2	25.75	88.1	11.8	2.37	173	237.2	111	13.98
84F 2004 SS 2038	14.0	6.22	70.7	5.1	0.55	72	243.3	39	6.84

Sample Number	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Mo (ppm)	Ag (ppb)	Ba (ppm)	Hg (ppb)	Pb (ppm)
84F 2004 SS 2040	25.3	19.84	100.3	7.1	0.90	127	252.9	77	10.49
84F 2004 SS 2042	27.0	17.96	89.9	7.2	0.95	130	238.9	83	10.55
84F 2004 SS 2044	27.1	22.39	103.0	8.4	1.69	130	334.4	85	12.09
84F 2004 SS 2045	25.0	22.60	98.6	12.0	2.13	147	263.6	95	11.61
84F 2004 SS 2046	17.7	24.73	78.5	15.7	3.39	174	277.3	98	15.90
84G 2004 SS 1002	37.5	31.18	136.5	9.9	1.68	205	280.3	102	13.89
84G 2004 SS 1003	23.2	14.19	68.6	9.7	0.84	120	285.5	77	9.77
84G 2004 SS 1005	23.0	20.96	91.8	13.7	2.01	133	151.5	98	12.01
84G 2004 SS 1006	16.5	21.97	68.7	12.6	2.43	121	238.2	86	10.69
84G 2004 SS 1007	55.1	26.37	153.8	8.4	1.60	153	337.1	73	13.45
84G 2004 SS 1008	28.6	19.93	89.7	7.0	1.45	136	303.5	76	10.43
84G 2004 SS 1009	41.4	29.04	141.2	7.6	1.48	173	368.0	95	12.25
84G 2004 SS 1010	21.5	16.77	78.3	8.5	1.20	111	248.7	65	9.18
84G 2004 SS 2002	21.4	15.56	79.9	9.3	1.23	107	228.7	70	8.77
84G 2004 SS 2003	58.4	43.43	156.9	16.5	2.55	223	274.4	118	18.71
84G 2004 SS 2004	26.6	36.68	102.1	11.4	2.32	270	306.6	117	15.19
84G 2004 SS 2005	34.1	21.38	97.3	8.2	1.39	111	287.4	83	10.20
84G 2004 SS 2007	23.2	16.05	77.8	8.4	1.35	111	264.1	63	9.70
84G 2004 SS 2008	13.7	10.54	58.0	5.2	0.52	79	182.0	43	7.36
84G 2004 SS 2009	12.4	9.83	57.5	5.2	0.40	80	164.7	34	7.50
84G 2004 SS 2010	27.4	21.29	98.1	10.3	2.17	143	233.4	62	11.18
84G 2004 SS 2012	26.7	21.25	111.1	10.4	1.53	154	361.2	70	12.99
84G 2004 SS 2013	18.8	17.21	73.3	13.8	1.92	141	276.7	92	12.11
84G 2004 SS 2014	20.5	15.06	71.4	9.2	1.71	97	262.3	66	9.27
84G 2004 SS 2015	36.4	23.89	105.8	12.4	2.16	173	347.0	117	13.45
84G 2004 SS 2016	29.5	20.77	112.9	11.8	2.61	144	294.9	69	13.07